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Physical Qualities of High Chrome Steel

Relation Between Hardness and Double Carbides in Solution—Critical Temperatures—Maximum Tensile Strength and Ductility

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IN the development of the high compression internal combustion engine, the manufacturer has had to rely strongly on the services of the metallurgist to furnish materials which would possess the necessary physical properties to function properly under the severe conditions existing in an engine of this type. The higher development of these engines for use in aeroplanes, where low weight per horsepower combined with maximum stability are absolutely essential to the success of the motor, has thrown an added responsibility on the shoulders of the metallurgist and the science of metallurgy has been taxed to discover new ma-

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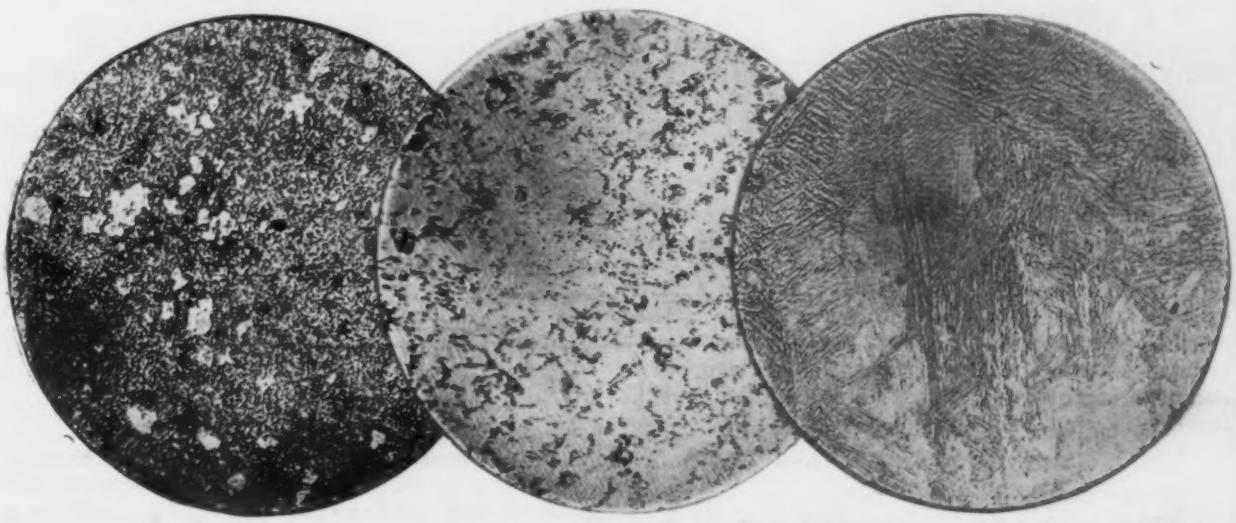
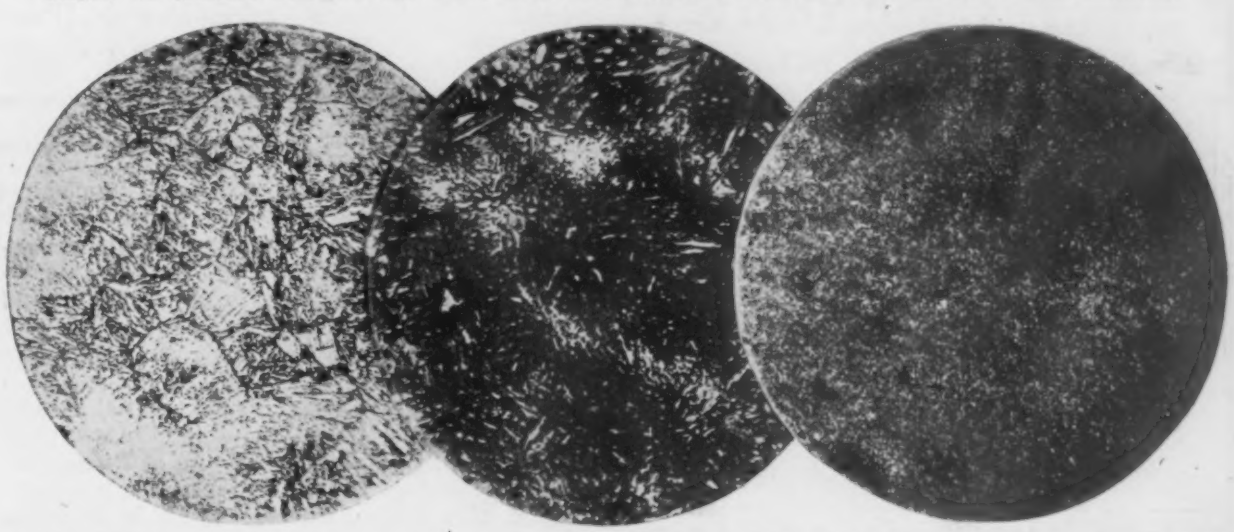


Photomicrographs of Internal Structure of High-Chrome Steel Resulting from Different Kinds of Heat Treatment: (Left) Slowly cooled from 1550 deg. Fahr., Brinell 168, structure sorbitic containing some free crystals of chromi-ferrous ferrite; (Center) Oil quenched from 1700 deg. Fahr., Brinell 512, structure martensitic matrix with numerous double carbide globules; (Right) Oil quenched from 2150 deg. Fahr., Brinell 565, structure 100 per cent martensite; all 200 magnifications



Photomicrographs of High-Chrome Steel, Magnified 200 Times, Oil Quenched at 2150 deg. Fahr. Drawing temperatures: (Left) 1000 deg. Fahr., below Ar_1, gives Brinell 477, structure martensite surrounded by troostite envelopes; (Center) 1100 deg. Fahr., at "red hardness," gives Brinell 340 and structure troosto-sorbitic; (Right) 1450 deg. Fahr. gives Brinell 241 and structure uniformly sorbitic

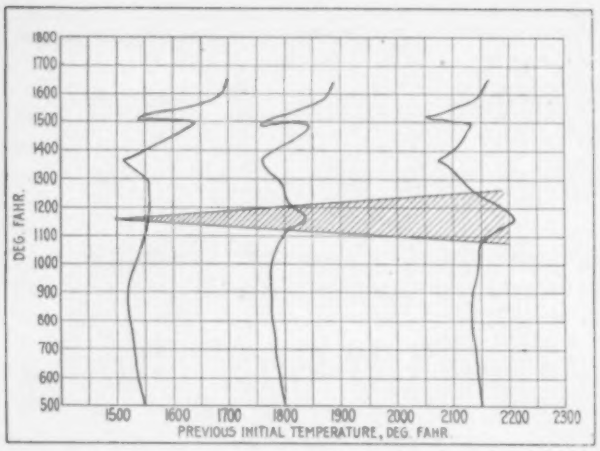


Fig. 1—Heating Curves on High-Chrome Steel, Showing Effect of Previous Initial Temperature on Magnitude of Red Hardness (Shaded Area)

terials or new properties of existing materials which are better suited to the severe conditions imposed.

A typical point in view are valves. These parts have been progressively made from tool, chrome-nickel, low-tungsten and high-speed steels. A most interesting development has been the use, within the last few years, of a high-chromium steel for valves. This is generally specified with a chromium content of 11 per cent to 14 per cent and is known as stainless steel on account of one of its qualities.

It is interesting to note that this steel was patented at about the same time in England by Harry Brearley and in America by Elwood Haynes. To adjust all interference, the rights and interests of both inventors have been purchased by an American concern.

The steel exhibits interesting tensile properties and Brinell hardness figures under different heat treatments. For valve duty, however, the prime requisites are non-corrodibility at higher temperatures and freedom from warp. To arrive at a better understanding of the position of the critical points and the effect of different temperatures upon them, a series of tests have been run covering critical points, microstructures, heat treatments and brinells.

Previous Experimental Work

Faraday and Stoddart in 1820 first conceived the idea of alloying chromium (then a newly discovered element) with iron. They proceeded on the theory that chromium, which was thought to be of very hard nature, could be used to replace carbon in steel used for tools and other purposes.

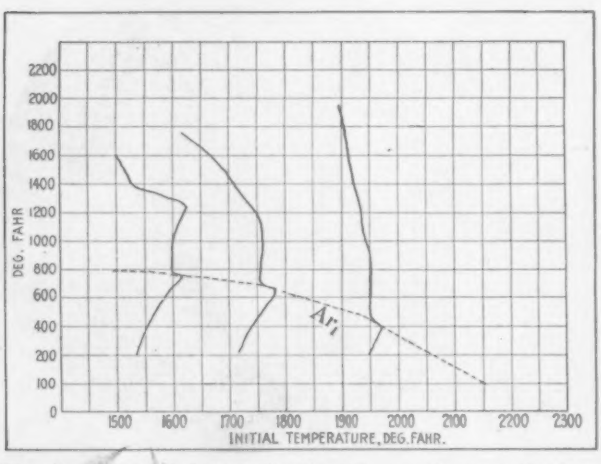


Fig. 2.—Effect of Initial Heating Temperature on Position of Ar_1 Range of Cooling Curves on High-Chrome Valve Steel

Later work undertaken by M. G. Rolland (*Annals de Chemie*, 1877, vol. XIII, p. 152) and R. A. Hadfield (*Journal* Iron and Steel Institute, 1892, part 2, pp. 49-175) disproved this theory and showed that without carbon, chromium had little hardening effect on iron.

Up to the most recent times, chromium steels could not be made with optional carbon contents, since methods for producing carbon-free ferrochrome were not known. As a result the carbon content rose in proportion to the percentage of chromium present in these steels. Thus while extensive investigations were made on the properties of high-carbon, high-chromium steels, practically nothing was known of low- and medium-carbon, high-chromium alloys.

Osmond (*Journal* Iron and Steel Institute, 1892, part 2) in his exhaustive work on high-carbon chrome alloys found that there were remarkable variations in physical properties with slight changes in thermal treatment. His deductions in regard to microstructure and the nature and existence of the carbides in chromium steels have been strengthened by the analytical work of Carnot and Gautol (*Journal* Iron and Steel Institute, 1892, part 2) and more recently by that of Arnold and Read (*Journal* Iron and Steel Institute, 1911, part 1). These in substance are that chromium can exist in at least three conditions in steel, namely: (1) as a solid solution; (2) as a compound of chromium, iron and carbon in form of globules and (3) as double carbides in solid solution. The composition of these carbides was found by Arnold and Read to be Fe_3C, Cr_3C_2, Cr_4C in a steel having 0.85 per cent carbon and 10 per cent chromium.

Ternary alloys of iron, carbon and chromium are classed in that group in which the special element not only lowers the critical temperature, but also results in the production of cementite. A study of the constitutional diagram (Guillet, *Genie Civil*, vol. 44, 1904) shows that with a carbon content of 0.40 per cent, steels up to 6 per cent chromium are pearlitic from 6 to 15 per cent, martensitic and cementitic above 15 per cent.

"Stainless steel," as commonly known, comes into the second class and has the following approximate percentage composition: Carbon, 0.20 to 0.40; chromium, 11 to 14; silicon and manganese not to exceed 0.5; sulphur and phosphorus not to exceed 0.04.

The steel on which our experiments were made had the following analysis:

	Per Cent		Per Cent
Carbon	0.330	Phosphorus	0.015
Manganese	0.460	Chromium	11.020
Sulphur	0.030	Silicon	0.450

Critical Temperatures

Differential heating curves on specimens (Fig. 1) whose previous initial temperature did not exceed 1550 deg. Fahr. showed no transition points until in the region of 1300 deg. Fahr., at which point the characteristic iron carbide change occurred. That not enough iron carbide was retained in solution, however, in samples quenched in the range between 1300 deg. Fahr. and 1495 deg. Fahr. to cause any hardening action is shown by the curve in Fig. 3.

With specimens having previous initial temperatures of 1600 deg. Fahr. and above, an evolution of heat was noted as occurring in the neighborhood of 1100 deg. Fahr. However, the most significant fact which presents itself is that the magnitude of this evolution increases with higher

initial temperatures up to 2150 deg. Fahr. This is illustrated by the shaded area in Fig. 1.

From a study of the differential cooling curves it is evident that the higher the initial temperature the lower is the position of the Ar_1 range coupled with a suppression of the $Ar_{1,2}$ range, until (as indicated by the slope of the curve through the Ar_1 points in Fig. 2) the former occurs below atmospheric temperature after cooling from 2150 deg. Fahr.

In obtaining the heating curves the rate was approximately 12 deg. Fahr. per min. On cooling, all specimens were held at initial temperature 5 min. to insure equilibrium and then cooled at rate of approximately 16 deg. Fahr. per min.

Experimental Heat Treatments

The relation between quenching temperature and Brinell hardness was determined by running a series of test bars ¾ in. in diameter and 1 in. long at various heats. Quenching just above Ac_1 does not give maximum hardness as would be obtained in carbon steel of the same carbon content. But instead, hardness increases as quenching temperature rises, due to an increase in amount of double carbides held in solution until at a temperature of 2150 deg. Fahr. all carbides are in a state of solid solution and maximum hardness is attained. That this temperature gives maximum "red hardness" is indicated in both Figs. 1 and 4.

Table 1.—Effect of Raising Quenching Temperature in Increasing Hardness

Specimen Number	Oil Quenched From, Deg. Fahr.	Brinell Hardness
1	1200	198
2	1300	201
3	1325	192
4	1350	195
5	1400	196
6	1450	174
7	1475	179
8	1500	172
9	1550	405
10	1600	430
11	1700	512
12	2150	564

Note—All samples had previously been pack annealed at 1550 deg. Fahr. and very slowly cooled.

In order to determine the effect of different quenching temperatures on hardness of heat-treated samples, three series were run. All samples were pack annealed at 1550 deg. Fahr. and cooled in furnace. Series A was oil quenched from 2150 deg. Fahr., series B from 1700 deg. Fahr., and series C from 1550 deg. Fahr. Samples were then drawn at heats indicated in Table 2 and air cooled.

Table 2—Brinell Hardness of Specimens Oil Quenched, Drawn at Temperatures 800 to 1500 deg. Fahr., and Air Cooled

Drawing Temperature, Deg. Fahr.	Series A. Oil Quenched from 2150 Deg. Fahr.		Series B. Oil Quenched from 1700 Deg. Fahr.		Series C. Oil Quenched from 1550 Deg. Fahr.	
	Number	Brinell	Number	Brinell	Number	Brinell
800	A1	512	B1	444	C1	418
900					C2	415
1000	A2	477	B2	417	C3	375
1100	A3	340	B3	282	C4	269
1150	A4	321	B4	282		
1200	A5	330	B5	257	C5	241
1250	A6	286	B6	255	C6	248
1300					C7	237
1350	A7	262	B7	228	C8	227
1400	A8	262			C9	228
1450	A9	241	B8	223	C10	230
1500	A10	430	B9	387	C11	399

It is interesting to note that as the quenching temperature increases the Brinell-draw temperature curve is displaced proportionally. And also, as the critical temperature is reached, air hardening takes place. This air-hardening property which is characteristic of the steel and is equivalent to either oil or water quenching, can only be eliminated by slow cooling over a period of several hours. As stated above, the draw curves indicate the range in which "red hardness" is lost and in addition the magnitude of "red hardening" properties.

*Arnold and Read—*Journal* Iron and Steel Insitute, part 1, 1911.

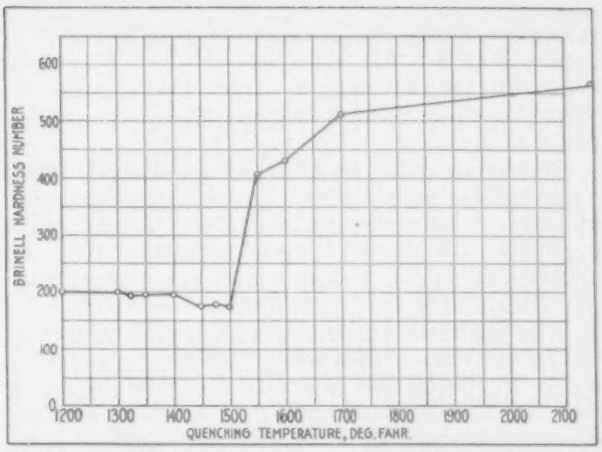


Fig. 3.—Brinell Hardness Curve, which Between Quenching Temperatures 1200 to 1500 deg. Fahr. Shows No Iron Carbide Retained in Solution, to Cause Hardening Action

The tensile properties of a series of alloys containing 0.62 to 32.46 per cent chromium and ranging in carbon from 0.75 to 0.95 per cent have been investigated by M. Albert M. Portevin (*Revue de Metallurgie*, vol. 8, 1911). The tensile strengths exhibited by steels containing from 1 to 20 per cent chromium are unusually high when the fact is taken into consideration that the only treatment was an annealing heat at 1530 deg. Fahr. for 3 hr. With the chromium running from 10 to 15 per cent a range in tensile strength of from 150,000 to 188,000 lb. per sq. in., a yield point of 94,000 to 113,000 lb., and reduction of area of 4 to 15 per cent were obtained.

That carbon plays an important rôle, in that smaller amounts give more desirable properties, is borne out by data of physical properties obtained on heat-treated specimens of high-chrome valve steel, as follows:

Table 3—Properties of Low-Carbon High-Chrome Steel

	Drawing Temperature, Deg. Fahr.		
	1250	1350	1450
Elastic limit, lb. per sq. in.	127,500	113,250	99,000
Ultimate strength, lb. per sq. in.	154,600	137,650	123,875
Elongation, per cent	17	18½	21
Reduction of area, per cent	44½	42½	49½
Brinell hardness	321	302	255

Note—Test bars were oil quenched from 2150 deg. Fahr. and drawn as given.

Upon very slow cooling, from 1550 deg. Fahr. over a period of several hours, a sorbitic structure was obtained containing some free crystals of chromi-ferrous* ferrite. Photomicrograph No. 1 is characteristic of a specimen which had been slowly

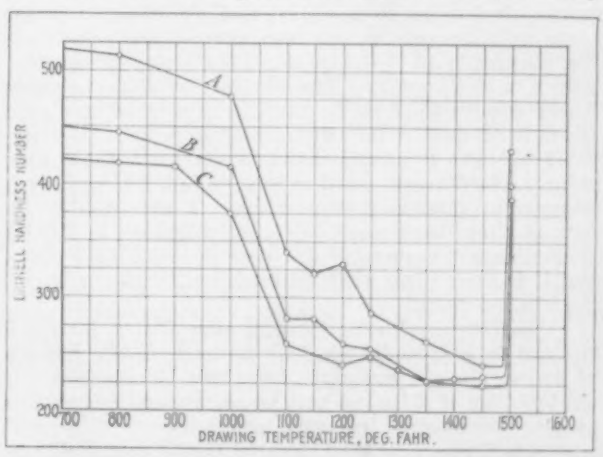


Fig. 4.—Brinell Hardness Curves of Test Specimens Quenched as shown in Table 2

cooled from 1550 deg. Fahr. to 600 deg. Fahr. over a period of 3½ hr., representing the softest condition of this alloy with a Brinell hardness of 168. This as well as the following sections were magnified 200 diameters.

Referring to the photomicrographs, No. 2 shows a martensitic matrix with numerous double carbide globules. This specimen, which was given a 1700 deg. Fahr. oil quench, may be compared with that represented in No. 3 showing 100 per cent martensite after a 2150 deg. Fahr. quench.

The difference in structure between heat-treated specimens drawn above and below the range in which "red hardness" is lost is illustrated in Nos. 4 and 5. The former apparently consists of well-developed crystals of martensite surrounded by envelopes of troostite, while the latter is troosto-sorbitic in nature containing some unaffected martensite. No. 6 shows a uniformly sorbitic structure obtained on specimen drawn just below the critical range, namely 1400 to 1450 deg. Fahr.

The etching of samples for microscopic inspection was accomplished successfully by use of a reagent consisting of two parts of 50 per cent solution of hydrochloric acid, two parts of a 15 per cent solution of ammonium persulphate, and one part of a concentrated alcoholic solution of o-nitrophenol. By use of this solution warmed, quick action resulted, whereas with aqua regia the effect was slight and resulted in considerable pitting after long-continued immersion.

Summary

1. Results bear out the intimate relation between amount of double carbides in solution, maximum hardness and magnitude of "red hardness."

2. With minor exceptions, the micro-constituents are analogous to those with which we are familiar in ordinary carbon steel.

3. With a quenching temperature of 2150 deg. Fahr. all carbides are in solution, giving the most uniform structure, and also maximum hardness. Under these conditions tensile strength and ductility are maximum after suitable drawing treatment.

4. The effect of initial temperature on the position of the Ar_1 point is an indication of the amount of carbides retained in solid solution.

BUILDING STEEL SHIPS

Senator Jones Makes Strong Plea for Pacific Coast Yards

WASHINGTON, Jan. 28.—The fight to release American shipyards so that they can build steel ships on foreign contracts has been carried to the floor of the Senate by Senator Jones of Washington. In a spirited address he demanded that these yards be allowed to compete again for building foreign tonnage as a necessary method of finding employment for American labor. He blamed President Wilson for continuing the restriction which has paralyzed this industry.

He charged that the refusal of the shipping board to permit building for foreign contracts had kept our yards from building a million tons of wooden ships for Norway. These contracts have since been given to British builders, he said. The shipping board released this restriction on wooden shipbuilding Dec. 6, 1918, but it was too late.

The Senator then continued: "Forty wooden ships are to-day building in British Columbia that would have been built at Tacoma, Wash., if a permit could have been secured."

Built with French Money

"The Foundation Co.," he said, "put in a wooden-ship yard at Tacoma, Wash., and other yards elsewhere with French money, and took a contract to build 20 wooden ships for France. It completed its contract a short time after the armistice was signed. France wants steel ships in a hurry, and she began negotiations with the people who had invested their money in the shipyards at Tacoma and Portland and at other points in this country. She wanted 150 8800-ton ships. These wooden-ship yards could be converted into steel yards in 60 days. The owners wanted to do it, but they could not get a permit, however, to build these steel ships. The Tacoma yard is idle to-day, although it is anxious to construct these ships. I am reliably informed that the French have let contracts to British shipbuilders for over 300,000 tons of these steel ships, and it is very likely that contracts will soon be let for the whole amount.

"The Norway-Pacific Construction & Dry Dock Co. has put in a splendid yard at Everett, Wash. hoping, of course to get contracts from the Government for the building of ships, as well as contracts from private people. Norwegian interests are anxious to give it contracts for several steel ships of 12,000 tons and over, costing a million and a half or two million dollars. It cannot take them because it is not able to get a permit.

"I want to read an extract from a letter that I received the other day from this company. It says:

"'Our yard is now practically completed, and we are in a position to take on contracts for three years' work the minute we are authorized to construct for foreign account, and, as you know, our yard will alone employ from three to four thousand men, and as we are going to give preference to returned soldiers there seems to me to be an additional legitimate reason why the shipping board should act.'

"Italy wants steel ships built and needs as many as France. Her capital has come to our shipyards, and has sought contracts from them. But they cannot build for her."

Letters from Shipping Board

Senator Jones then quoted letters from the shipping board which declared that the restriction remained in force by the direction of the President.

"I shall not speculate upon why the President does not remove these restrictions," continued Senator Jones. "I shall not speculate as to why he prevents our people from getting these contracts and allows the contracts to be turned to foreign yards.

After Senator Jones had concluded his speech, Senator King of Utah introduced a joint resolution providing "that the United States Shipping Board be, and is hereby, directed to cancel, abrogate and annul any and all orders, rules or regulations which prevent the construction of ships for foreign Governments or for foreign shipping corporations in shipyards within the United States, or which prevent the acceptance of orders for such construction by any shipbuilding corporation within the United States; and that said shipping board is further directed to facilitate the acceptance of such orders and the construction of such ships in the yards under its jurisdiction."

The resolution was referred to the Committee on Commerce.

It has been recognized for some time that there is genuine need for a metallurgical society in the Pittsburgh district, to be exclusively confined to that branch dealing with steel, iron and their alloys. Recently a meeting of a number of metallurgists to discuss this matter was held in the Fort Pitt Hotel, Pittsburgh, and the formation of such a society was decided upon, its aim being the promotion of the arts and sciences connected with the metallurgy of iron and steel and their alloys. A committee to work out plans was appointed, of which D. L. Mathias of Mackintosh, Hemphill & Co. was made chairman.

Durability of High Speed Steels

Russian Cutting Tests with Nine Brands—Chemical Composition and Requirements—Results Compared with Taylor's Conclusions

BY R. POLIAKOFF*

THE experiments, the results of which are given in this article, were made some time ago in Russia on behalf of one of the largest Russian railroads, in the laboratory of the Technical Institute of Moscow. While it is some time since they were made, they are, in the author's opinion, of considerable interest even at the present time.

Nine brands of high-speed steels were tested. All of them were about the same price per pound, as the experiments had to show which of the brands, other conditions being equal, was the best, which would last the longest and be the most economical in use.

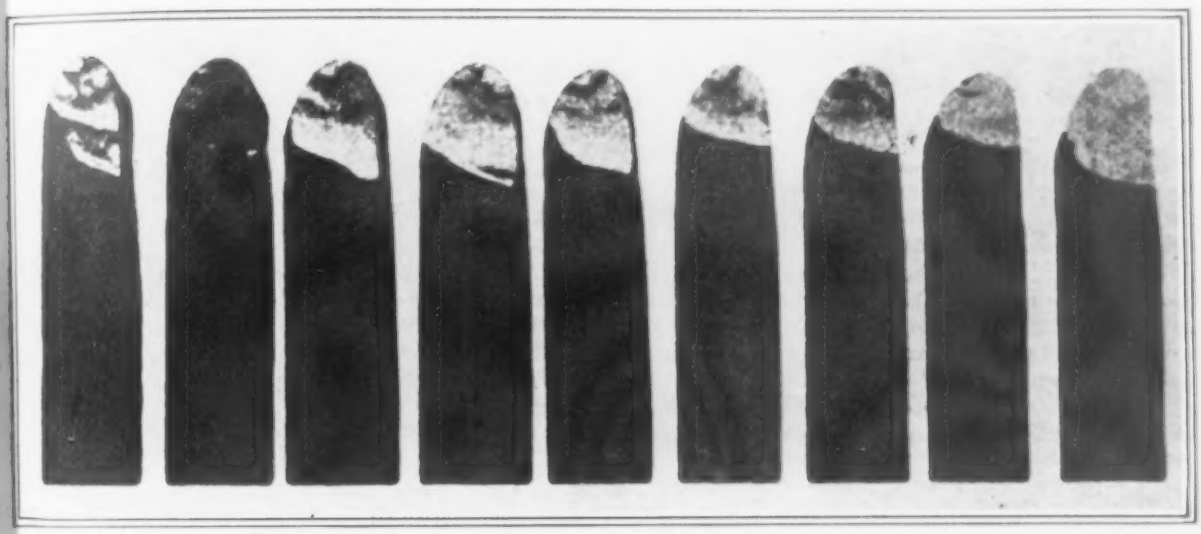


Fig. 1—Appearance of the Nine Tools of High Speed Steel After They Had Failed. They were originally of the same size and shape

The heat treatmnet of each (steel forging, hardening, etc.) was carried out according to the directions provided by the maker. The heating was done in charcoal or in coke and the cooling in air, tallow or oil, according to the directions. The same applies also to the grinding of the tools. As a matter of course, all other precautions and directions usually recommended for the making of lathe cutting tools were adhered to; for instance, the cutting of the tools from the bar was done not in a cold state, an overheating of the tools in grinding was avoided, etc.

The material, a steel bar on which the tools were tested naturally remained the same during all the tests. This bar ought to have been, by the specifications of the tests, similar in composition and qualities to tire steel; its physical qualities and carbon content are given in Table 1. The original diameter of the bar was 12 in., its length 60 in. After each test the bar was tested for hardness with the Shore scleroscope and it was found that the hardness figure at each test was about the same, 37 to 38, which shows that the bar was thoroughly forged. This also was to be expected, because the bar was ordered especially for these tests from one of the largest Russian steel mills.

Before the tests began the bar was turned in order to remove the scale and skin, and it was found that it did not show any slag impurities, pores, etc. on the surface. All the tools were made of the same dimensions, 1 x 1 x 13 in., and were of the same shape, as can be seen from Fig. 1, which shows all the tools after they failed, or when they had become blunt after the respective cut was taken. Fig. 2 shows the different angles of the tools.

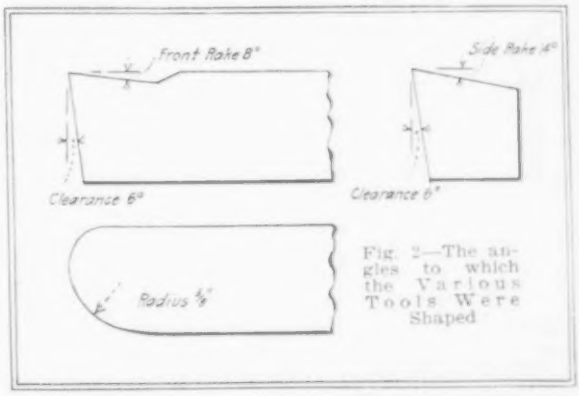


Fig. 2—The angles to which the Various Tools Were Shaped

The lathe on which the tests were carried out was of the single-pulley type, but for the purposes of the tests the pulley was taken off and the lathe was connected with a variable-speed electric motor through corresponding gearing, which permitted any cutting speed desirable, the final one chosen for the tests, 39.3 ft. per min. (12 meters) included. (See Table 1.)

The tools were set at the height of the center line of the lathe and projected from the tool holder to the least possible extent which remained the same during all the tests and for all the tools. All the tools worked dry, that is, without any cooling medium.

Before the experiments proper were begun a few preliminary tests were made, the object of which was to find the cutting speed which, with the

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given or selected depth of cut and feed, deteriorates one of the steels after an approximately 20 minutes' run. These preliminary experiments gave the cutting speed to be 39.3 ft. per min. (12 m.) for the chosen brand of steel, and accordingly all the tests were carried out under this speed. The average results of the tests are given in Table 1; the different brands of steel are marked Nos. 1 to 9. The table shows that the durability of the steels, notwithstanding they all were of the same price, was different, and varied from 21 min. 30 sec. to 2 hr.

The test with the steel No. 9' (last horizontal line of Table 1) represents a controlling test; it was made with the steel brand a few months later, after all the previous tests had been made. The steel was delivered this time from another lot altogether, and the test was undertaken with a double purpose: To ascertain whether the contractor of this brand of steel, which was selected by the railroad after the tests, delivers always the same goods under the same name, and to ascertain in an indirect manner to what extent the tests made could be considered as reliable and trustworthy, although it goes without saying that they were carried out with all the precautions necessary. This test was made during the luncheon recess when most of the machines of the institute stood still and the voltage of the power plant was therefore the highest; for this reason the cutting speed could not be kept below 41.8 ft. min. (12.75 m.), and the durability turned out to be in this case 1 hr. 40 min. It can, therefore, be said that with a cutting speed of 39.3 ft. per min. (12 m.) the result would have been about the same as in the original test No. 9 with a corresponding durability of 2 hr.

Table 1—Durability Tests of the Nine Brands of High Speed Steel

Steel Brand No.	Section of Tool	Kind of Tool	Profile of Cutting Edge	Angles of Tool[3] Clearance	Front Rake	Side Rake	Cutting Speed, Ft. Min.	Size of Cut Depth, In.	Feed, In.	Cooling Medium	Duration of Cut Min.	Sec.
1.....	1x1 in.	Roughing	Round nose; radius of curvature, ⅜ in.	6 in.	8 in.	14 in.	39.3 (12 meters)	1/7 (3.63 mm.)	1/18 (1.41 mm.)	None	21	30
2.....	1x1 in.										23	20
3.....	1x1 in.										33	45
4.....	1x1 in.										46	
5.....	1x1 in.										48	25
6.....											50	45
7.....											55	40
8.....											63	17
9.....											120	
9'.....											100	

Steel bar on which the tools were tested, carbon content 0.45 per cent. Its physical properties were: Tensile strength, 56 tons per sq. in. (41)[2]. Contraction, per cent. 4 (3.2)[2]. Elongation, per cent. 4 (1.58)[2]. Hardness (Scleroscope) 37-38. [3]Ground on a Universal Lathe Tool Grinder. [2]See text. [2]The numbers before the brackets refer to a specimen 2 in. long cut out alongside the bar, those in brackets refer to a specimen 8 in. long cut out at right angles to the axis of the bar.

From the table one can draw some very interesting conclusions which are compared here with the conclusions of the late Frederick W. Taylor in his work on the "Art of Cutting Metals."

The carbon content was very low in all the nine brands of steel tested (maximum 0.61 per cent). The older high-speed steels had a considerably higher carbon content, up to 1.28 per cent. According to Taylor, the best high-speed steel has to have a carbon content not above 0.68 per cent and not below 0.50 per cent, in order that the steel may be easily forgeable, may not be brittle, but sufficiently hard. One sees that the latest high-speed steels have their limit of carbon content still lower.

All of the nine brands of steel show practically no manganese; the older high-speed steels had a manganese content up to 0.30 per cent. Taylor recommended that the manganese content should be as low as possible because with a low manganese the steel becomes more ductile, less brittle, less liable to fire cracks and more easily forgeable. It seems that this recommendation of Taylor has become a rule.

According to Taylor, a good high-speed steel should contain not more than 0.15 per cent silicon. Table II shows that this recommendation has also evidently been accepted. We see even that the steels with the lowest silicon content showed the longest durability (steels Nos. 8 and 9). It seems also that the influence of silicon can, to a certain extent, be set against the influence of tungsten (compare steels Nos. 4 and 5 and Nos. 1 and 3).

The sulphur and phosphorus content in all the nine brands of steel was low, especially the first one.

According to Taylor, the best high-speed steel should contain from 5.5 to 6 per cent chromium and 18 to 19 per cent tungsten. The steels which corresponded mostly to these recommendations were brands 6 and 9, yet it would hardly be possible to draw any conclusions therefrom, especially if one takes into account the fact that these brands contained also molybdenum and vanadium. No. 9 gave the longest durability and shows the highest contents of molybdenum and vanadium. On the other hand, the older high-speed steels tested by Taylor contained either molybdenum or vanadium. The newest high-speed steels contain also mostly either the first or second of these two elements. It seems, therefore, that the mutual influence of molybdenum and vanadium has still to be investigated.

Table 2—Chemical Composition of the Steels Tested

Steel Brand, No.	Carbon, Per Cent	Silicon, Per Cent	Manganese, Per Cent	Sulphur, Per Cent	Phosphorus, Per Cent	Chromium, Per Cent	Tungsten, Per Cent	Molybdenum, Per Cent	Vanadium Per Cent	Nickel, Per Cent	Duration of Cut Min.	Sec.
1.....	0.46	0.15	Trace	0.003	0.026	4.24	14.53	...	...	.....	21	30
2.....	0.49	0.15	Trace	0.004	0.023	4.64	10.39	...	...	Trace	23	20
3.....	0.44	0.12	Trace	0.006	0.026	4.26	14.56	...	...	.....	33	45
4.....	0.61	0.15	Trace	0.004	0.035	4.28	16.44	...	...	0.31	46	
5.....	0.61	0.10	Trace	0.010	0.023	4.49	14.45	...	...	0.31	48	25
6.....	0.51	0.08	Trace	0.004	0.030	4.99	18.18	1.15	...	Trace	50	45
7.....	0.58	0.12	Trace	0.004	0.026	4.99	16.67	...	...	.....	55	40
8.....	0.43	0.08	Trace	0.005	0.025	4.64	14.53	...	...	Trace	63	17
9.....	0.50	0.10	Trace	0.003	0.020	5.04	18.54	1.56	0.82	.....	120	

Six of the tested steels showed nickel content, two of them 0.31 per cent. Neither the chemical composition of steel shown by Taylor nor some of the newest ones show any nickel content. It seems, therefore, that it would be highly interesting to investigate the influence of this element upon the properties of high-speed steels.

Standard Large Taper Shanks and Sockets*

Development of Magnum Tapers Having Diameters from 4 to 14 In. and from 3¼ to 12 In. at Large and Small Ends

BY LUTHER D. BURLINGAME

ONE of the many problems presented by war needs is that of designing machine tools of far greater size than any previously built, and, in proportioning those which require the use of taper shanks and sockets, the taper per foot and the length must be determined.

No standards are known to have been established for tapers of the large sizes now required for these machines or which the exigencies of the near future may require. The problem of working out such a standard was presented to the Brown & Sharpe Mfg. Co., and after an extended investigation and study of the conditions to be met, it has arrived at the tentative form here described. The choice was based on a study and analysis of present established tapers, an investigation of the laws governing the use of tapers and a referendum of experience and opinion from a number of manufacturers and engineers who, because of their close contact with conditions most nearly like those desired to be met, it was felt could best judge the requirements.

Up to recent times, tapers for shanks and sockets above 3 in. diameter have had a somewhat limited use. For lathes, drill presses, boring mills, and milling machines where the conditions of use are somewhat similar, the tapers used have varied from ½ to 1½ in. per ft., with varying lengths. Table 1 gives particulars of those widely used.

This wide variation, where the conditions seem about the same, raises a question as to what, if any, are the reasons for such variation, and whether any rules can be laid down determining the most satisfactory taper. As it would not be feasible to change tapers now in extensive use, this would be a mere academic question were it not that new sizes are required.

Table 1.—Tapers in General Use

Taper per Ft., In.	Included Angle	Ratio	Name	About When Introduced	Where Used
½	2° 23′	1:24	Brown & Sharpe	1860	Milling machines and general.
⅝	2° 52′	1:20	Jarno	1889	Reed lathes, Pratt & Whitney machines, etc. Also used for German metric tapers.
⅝	2° 59′	1:19.212	Morse	1862	Twist drills, drill presses, etc.
¾	3° 35′	1:16	Sellers	1862	Lathes, boring machines, milling machines, etc.
1	4° 46′	1:12	Cambria		Steam-hammer piston-rod ends.
1½	7° 9′	1:8	Muir (England)		Milling machines, "patent couplings" for arbors.

Most of the tapers mentioned in Table 1 were established before standardization was given much attention, and so the variations in size and depth are irregular even in a given system. Such formulæ as exist, if followed for the proposed larger sizes, would not give the proportions required. Thus the Brown & Sharpe taper, while increasing somewhat uniformly in depth to No. 12 (1½ in. diameter at the small end), would be longer than usually necessary if the same proportions were carried above that size. For this reason when B. & S. sizes above No. 12 were established at a later date than the small sizes, a new ratio for length was used, by which large sizes to No. 18 (3 in. diameter at the small end) do not increase as rapidly in depth relative to the diameter as is the case with the smaller sizes.

The "Jarno" taper, proposed by Oscar J. Beale of the Brown & Sharpe Mfg. Co. (and given its name because of the pen name "Jarno" under which Mr. Beale wrote), has an established ratio of diameter to length each ⅛ in. of diameter at the large end and each 1/10 in. at the small end adding ½ in. to the length. This standard, because of the easily remembered relations of its dimensions, has appealed to designers and has already come into quite extensive use. When the formula is applied, however, to large sizes, such as are here considered, it does not give practical proportions. So far as other standards now in use follow well-defined proportions in the relation of length to diameter, these proportions also fail when applied to large sizes.

Taper Per Foot

The well-established tapers for shanks and sockets now in use vary from ½ to 1 in. or more per ft., the tendency being to use a steeper taper for the larger than for the small sizes, perhaps because with small tapers the bite of the taper when forced into the socket is sufficient to secure effective driving. In the larger sizes, tenons or tongues must aid in driving, and in the still larger sizes keys of some form are needed as unless the angle of taper is very slight the tenons are liable to be twisted off. With such auxiliary means of driving the taper can be steeper, giving the advantage that the parts are more easily separated.

An illustration of the use of a greater taper per foot for large as compared with small sizes is found in the old "American" having 9/16 in. taper per ft. up to the size 1 in. in diameter at the small end, beyond which the taper became ⅝ in. per ft. An extreme application in steep tapers is in the couplings used for milling-machine arbors, made by William Muir & Co., Ltd., of England. These arbors are drawn into and removed from the socket by means of differential-threaded nuts, the taper being 1½ in. per ft.

On the other hand, tapers as slight as ½ in. per ft. have given satisfactory results in milling machines and other machine tools in constant use for at least sixty years. The bite on the small sizes is sufficient, when driven in place, to hold without working loose under jar, while the angle is not so small as to prevent driving apart when desired. It is found, however, that occasionally a taper of ½ in. per ft. will stick so tightly as to require considerable force to separate the parts, perhaps in such cases as where a cold arbor is driven into a heated spind'e. With a taper as slight as ½ in. per ft. there is seldom trouble from having the tenon twist off, as is so often the case with twist drills made with a taper of aproximately ⅝ in. per ft., and where on account of the greater taper the bite of the taper fit does not carry so great a proportion of the load.

Principles on Which Tapers Depend

At the time Mr. Beale proposed the Jarno taper, he made an investigation of the principles on which the taper of shanks and sockets should be proportioned, and published his findings in the *American Machinist* of Oct. 31, 1889.

After asking, "Is there a scientific principle involved in establishing a taper?" he answers: "There is this principle, that the angle of the taper must not be so large that a center will not stay when driven in and that the angle need not be so small as to make it very difficult to back the center out. The average angle of repose in metals having smooth surfaces that are oiled

*From a paper presented at the annual meeting in New York of the American Society of Mechanical Engineers, Dec. 1918. The author is industrial superintendent Brown & Sharpe Mfg. Co., Providence, R. I.

is placed by Unwin at 4½ deg. and by Willis at 5 deg. Rankin gives an angle the same as or a little smaller than Unwin and adds that in some experiments the angle has been as small as 2 deg." From a further demonstration Mr. Beale concludes, regarding tapers, that if the angle must be such as to permit slipping, it should be as great as 10 deg., while if it should not permit slipping, it should be less than 4 deg. Also:

> If a center be of a taper whose sides make an angle of less than 4 deg., it is not likely to slip out, after being driven in, even though it be oiled. An angle of 4 deg. makes a taper of nearly ⅞ in. per ft. No center, so far as I have seen, has a taper greater than this, which is interesting as indicating that the machinist, in practice, has not exceeded the angle of safety given in the textbooks. . . . The smallest center angle that I know is something less than 2½ deg., which in practice has been found to be small enough. We are, therefore, at liberty to choose any angle of taper between 2 and 4 deg.

Mr. Beale chose for the Jarno taper, 0.6 in. taper per ft. (2 deg. 52 min.) as an average between these limits. This gives a ratio of 1 in 20, a ratio since adopted for the German metric standard and is especially adapted for use with a decimal system of measurement. In applying it to the English system of measurement, however, it gives the dimension at one end of the taper in tenths and at the other end in eighths, a feature which lacks the advantage from using the taper of ¾ in. per ft., giving with each inch of depth, 1/16 in. variation in diameter, so that when applied to large tapers, whose depth may vary by 2 in. or 4 in., the diameters at both large and small ends come in whole or convenient fractional sizes.

A taper of ¾ in. per ft. also gives an advantage over 0.6 in. or other tapers with a less steep taper in the ease with which it will release when it is desired to drive it out. Further, it is a taper now in most general use for large work, although its proportions, as far as the writer knows, have not previously been standardized.

The taper of ¾ in. per ft. adopted by William Sellers & Co., Inc., of Philadelphia, about 1862, when they abandoned the flattened end or tenon and adopted a key fitting lengthwise of the taper for driving, rather than to depend largely upon the bite of the taper for that purpose.

William H. Thorne, in a paper on twist drills presented before the Society of Mechanical Engineers in 1885, after pointing out the objections to driving by a tongue, says:

> A far better device is a key, fitted permanently into the sockets, and extended the entire depth of the latter. This key fits a groove in the shank of the drill, and supplies a perfect means of driving the latter, with a minimum of wear and strain. The end of the shank for a short distance is turned smaller, and is hardened to prevent any upsetting by the use of a drift or wedge in removing the drill. The amount of taper proper for the shank is a disputed question. The Morse taper averages less than ⅝ in. in diameter per foot, but with drills driven by means of a key ¾ in. per ft. is better as it enables the drills to be more readily removed from the sockets, and at the same time prevents them from falling out by their own weight.

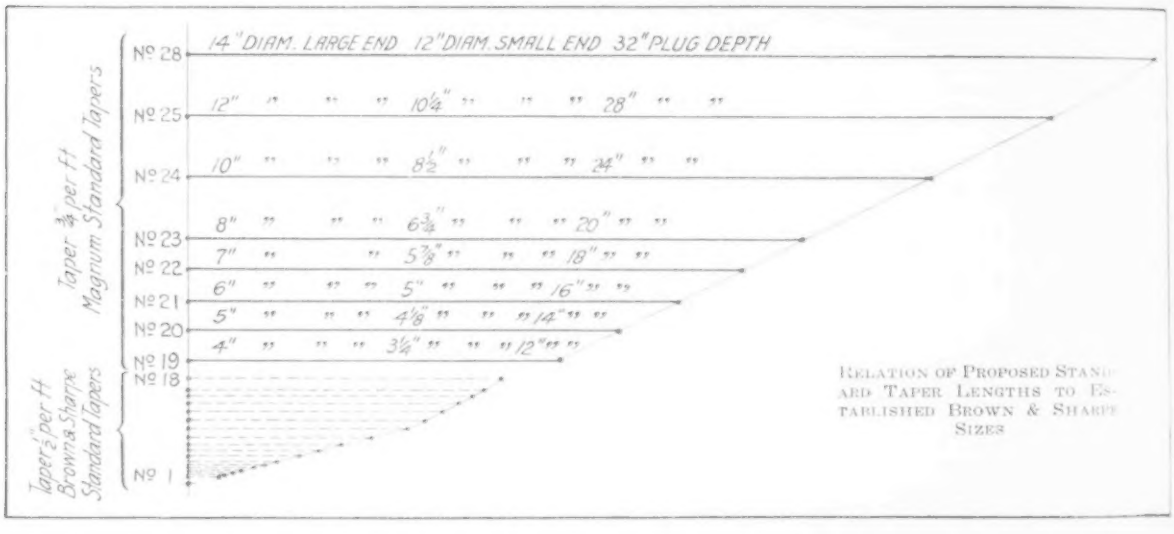
Mr. George R. Stetson, in discussing Mr. Thorne's paper, said:

> The objection to a sharper angle or taper is that the drill has a tendency to draw out of the socket when coming through its work. This twists the tongue and produces most of the trouble complained of and would be best obviated by a taper of less than ⅝ in. to the foot.

What applies to the use of tapers for drills applies in general to the use of tapers for sockets and shanks and the conclusion can be drawn that if the bite of the shank is to be depended on to a considerable extent to do the driving, the taper should be small, even at the risk of finding occasional difficulty in separating the parts. On the other hand, if adequate means of driving are provided in addition to the bite of the taper, there are advantages in making the taper greater, although not so great as to allow of jarring loose or dropping out readily.

Assuming that in all cases of machine tools using these large tapers, either longitudinal keys or cross-hold-back keys or both will be used for driving, a greater taper per foot can be used, thus obtaining the advantage of easy removal with no sacrifice in driving efficiency. To meet these conditions a taper ¾ in. per ft. for large sizes seems ideal, based on scientific grounds and also on the experience of users.

While the length can be more elastic, a variation



RELATION OF PROPOSED STANDARD TAPER LENGTHS TO ESTABLISHED BROWN & SHARPE SIZES

being less objectionable than in the case of the diameter or taper per foot, it is desirable to standardize it also. As previously pointed out, the tapers already established do not give proportions for lengths suited to large sizes. Thus the Jarno formula would make a taper of 14 in. diameter at the large end, 56 in. long —much too long for practical needs and adding an excessive amount to the cost of gages and reamers as well as of the machine. A proportion used by manufacturers who have made the depth three times the diameter for moderately large sizes, is admitted by them to be probably longer than necessary even for these sizes. Such a proportion would make the above 14-in. taper 42 in. long.

The Proposed Standard

By the use of a constant, a formula has been derived applicable over a wide range, and giving, it is believed, satisfactory proportions. The diagram illustrates the relation of the proposed taper standard for length as derived from this formula, to the established Brown & Sharpe sizes, showing that these new tapers follow in a regular progression beyond the largest established Brown & Sharpe sizes.

As a result of this investigation the sizes in Table 2 are proposed, to be known as Magnum Standard Tapers. The reason for beginning the numbering at 19 is to avoid lapping on to the numbers of any of the systems now in use, No. 18 of the B. & S. standard being, so far as known, the largest standard as yet suggested.

No. 19 of the new system is proportionately larger than the B. & S. No. 18, so that, starting with No. 19 seems logical, even though the new standard has a different name and is of a different taper per foot than the old. It will be noted that the diameters at the large end are made basic and vary by inches, and with the length of taper obtained by the formula the diameters at the small end are in convenient fractional sizes.

Table 2.—Magnum Standard Tapers Designed by the Brown & Sharpe Mfg. Co.

No. of Taper	Diam. at Large End, In.	Diam. at Small End, In.	Depth of Taper, In.	
19	4	3¼	12	
20	5	4½	14	
21	6	5	16	
22	7	5⅞	18	Taper = ¾ in. per ft. Depth of taper = 2 × diameter at large end + 4 in.
23	8	6¾	20	
24	10	8½	24	
25	12	10¼	28	
26	14	12	32	

Before determining on the proportions of the Magnum tapers the question of the proportions of large standard tapers was taken up with manufacturers and engineers having experience along these lines, in some cases by personal conferences, in others by sending the following letter:

We have been asked to carry our standard tapers above the 2 in. size, which is the largest we have so far standardized, and the question has arisen among our engineers as to whether in the large-sized tapers of this character, used for arbors, centers, etc., the taper should be more than ½ in. per ft. (our present standard), in order not to bind so tightly as to be difficult to drive out, and if made to a greater taper, what would be the limit at which the arbor would tend to jar loose.

We have been referred to you as having had direct experience in these matters, and we would appreciate the advantage of your professional experience or the practice of your company in this matter.

The question of depth of taper fit, that is, as to whether it should be 2, 2½ or 3 times the diameter, etc., is also a question involved.

If there is any well-known standard established, we desire to comply with same, rather than establishing something new.

Table 3.—Experience of Manufacturers with Large Tapers

Name	Kind of Machines	Taper per Foot Recommended	Depth Recommended	Remarks
William Sellers & Co. Inc. Coleman Sellers, Jr.	Lathes; horizontal boring machines	¾ in.	3 × diam. at large end (or a little less)	Have used up to 8 in. diam.
Mesta Mach. Co. J. E. Mesta, Asst. Supt.	Rolling-mill machinery, etc.	½ in.	3 × diam.	.....
Newton Mach. Tool Works Nicholas P. Lloyd, Gen. Mgr.	Milling machines, etc.	Use ⅝ as std.; rec. 1 in. for large	.....	Have used to 6 in. diam.
Tabor Mfg. Co. Wilfred Lewis, Pres.	General	0.6 or ¾ in.	.....	.....
Mead-Morrison Mfg. Co. J. T. MacMurray and Robt. Gow	General	1 in.	About 1½ in. × diam. + 2 in.	.....
Westinghouse Elec. & Mfg. Co. E. R. Norris	General	¾ in.	3 × diam.	.....
Bement & Miles W. J. Hagman	Steam hammers	½ and ¾ in.	.....	The greater taper used for sizes above 3½ in.
	Steam forge hammers	1 in.	.....	Sizes 2¼ to 12 in. diam.
	Lathes	¾ and 1 in.	Up to 5 in. at large end, 2½ -3 × diam. 5 in. & over, 2.1 & 2½ × diam.	Sizes above 5 in. are 1 in. taper per ft.
	Drilling & boring machines	¾ in.	.....	All sizes
	Milling machines	¾ in.	.....	All sizes

Table 3 gives a digest of the opinions received from various sources in answer to the writer's inquiry as to past experience with large tapers.

American Machinery Needed in Japan

ST. LOUIS, Jan. 27.—The growth of the steel and machinery industries in Japan during the last few years and the prospects for the sale of American machinery and metals in Japan were discussed here to-day by Dr. Frank R. Rutter, commercial attache of the American Embassy at Tokio, in an interview with the correspondent of THE IRON AGE. Dr. Rutter left Tokio on Dec. 12 and is en route to Washington.

"Japan needs a great deal of heavy machinery and large quantities of all metals with the exception of copper," Dr. Rutter said. "The iron, steel and machinery industries encouraged by special acts of the Government have had enormous growth in Japan during the last two or three years, but the Japanese manufacturers in these lines cannot hope to fill their domestic demand for many years to come.

"Now is the time for the American manufacturer who is seeking foreign trade to get busy in Japan. The first step should be the establishment of permanent branch offices in that country. In considering Japanese requirements of machinery and machine tools, this important fact should be held in mind by the American manufacturer: that the Japanese are not nearly so much interested in the labor-saving features of machinery as they are in the cheapness and lasting powers of machinery.

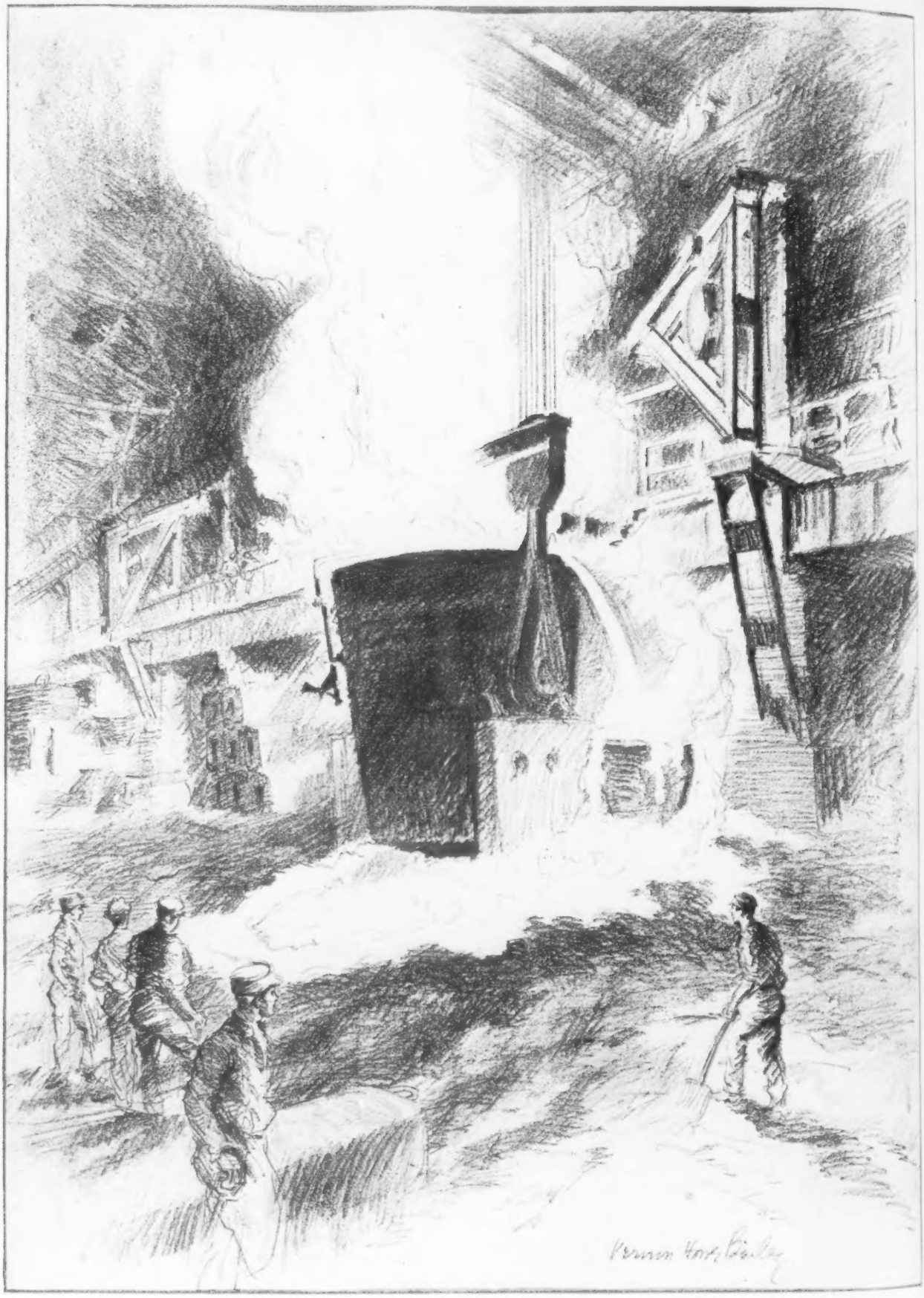
"Because of the abundance of cheap labor there Japanese manufacturers are not so much interested in automatic devices. The Japanese does not have the love for machinery that is characteristic of America. There the proprietor prefers to judge the importance of his plant by the number of people employed rather than by the production of the plant.

"Japan wants low-priced and heavy machinery. That is why most of the business in that line went to Germany before the war. German machinery did not produce as fast as did the American, but it cost less. German machinery did not last as long as English, but it cost less. Price is uppermost in the Japanese manufacturer's estimation of machinery. Permanency gets his next consideration and speed of production the last."

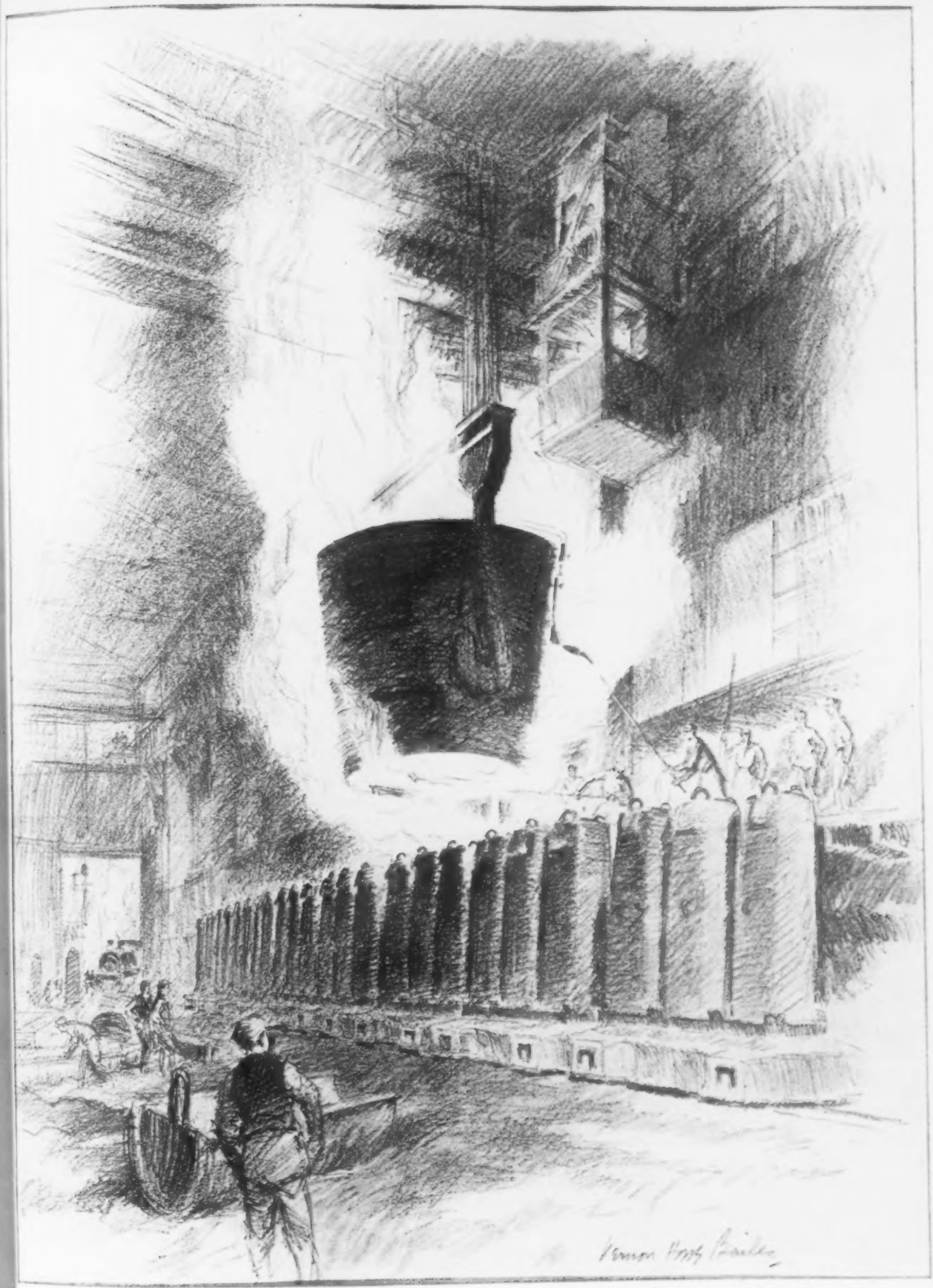
John B. Warren, secretary and general manager, Tacony Steel Co., Philadelphia, and George Satterthwaite, vice-president and general manager of the Tacony Ordnance Corporation, were hosts to their respective department heads at dinner at the Bellevue-Stratford, Philadelphia, Jan. 11. Following the dinner, at which there were 50 guests, Mr. Warren and Mr. Satterthwaite presented each of the guests, a substantial appreciation of the recipients' good work during the past year. The Tacony Steel Co. and the Tacony Ordnance Corporation are closely allied steel companies. The latter is only a little more than a year old, and has made a fine record in the production of gun forgings for the United States Army.

The Cornell Society of Civil Engineers has established a registration bureau for engineers at 30 East Forty-second Street, New York. Cornell engineers who have been in the military or naval service are being registered free, and the bureau will supply these trained men without charge to the employers. The bureau has a list of approximately 1000 men who have been or are about to be discharged. The registration records on file give complete information with regard to each man.

Hamilton & Hansell, Inc., 13 Park Row, New York, has formally opened at 141 Raymond Street, Brooklyn, a steel warehouse, which has been in existence since July, 1918, carrying a full line of tool steel and special alloy steels, in rounds, squares, octagons and sheets. It plans especially to take care of the cutlery trade. C. U. Ackerlind is manager of the steel department.



TAPPING an open-hearth furnace as seen by Vernon Howe Bailey. The scene, reproduced from a black and white drawing, is in the South Chicago works of the Interstate Iron & Steel Co., where there are four 75-ton open-hearth furnaces



CASTING steel ingots at the South Chicago works of the Interstate Iron & Steel Co. The action and atmosphere of this Vernon Howe Bailey drawing argue well for the widening field which increasing numbers of artists are finding in industry

TAXES ON MUNITIONS

Court Rules Government May Retain Large Amount Claimed by Carbon Steel Co.

A precedent in suits by munitions plants to have munitions taxes returned to them was established by Judge C. P. Orr in the United States District Court at Pittsburgh last week, when he ruled that the Government may retain $271,062.62 paid by the Carbon Steel Co. Judge Orr held that the profits on which this tax was levied were properly munitions profits, though the company contended that their product was not properly classed as munitions. Judge Orr held explosive shells are munitions when the steel bars are made in mill lengths. Concerns holding original contracts for munitions, he ruled, which sublet parts of the contracts, are liable for the tax on all specifications.

The principal features of the decision of the court in this important case are as follows:

Plaintiff (the Carbon Steel Co.) claims a right to recover from the defendant (the Government) the sum of $271,062.62, which the plaintiff charges was illegally assessed against it, and illegally exacted from it as a munition manufacturers' tax for the period ending Dec. 31, 1916. The plaintiff paid the amount of the tax under protest, and thereupon sought relief in the required manner from the commissioner of internal revenue. Relief was refused by the commissioner of internal revenue, and relief must be denied by this court.

Obtained Three Contracts

Long before the passage of the act which first provided for the collection of a tax from the manufacturers of munitions, the plaintiff procured three several contracts from the British Government for the delivery to the authorized representative of said government at New York, of 4½-in. howitzer shells. The contracts did not require that the steel company should manufacture the shells contracted for. They contemplated that some portion of the manufacturing might be done by the steel company, and that other portions might be done by sub-contractors. However, the steel company was bound to deliver the shells to the government when they were completed, and the government was bound to pay the steel company the price fixed in the contract. The plaintiff's plant was not equipped, and did not have facilities, for doing any of this work, except the manufacture of steel suitable for the shells, in bar form.

The plaintiff manufactured the steel bars in mill lengths, which were sent to another corporation, which partially sawed, cut or indented them, at points representing the required lengths of shell forgings, and thereafter redelivered them to the plaintiff, which then separated them into short lengths, which are known in the trade as slugs. The plaintiff then shipped the cut bars or slugs to the Westinghouse Machine Co., which, with the aid of the Union Switch & Signal Co., carried on the finishing process and delivered the shells to the plaintiff at the company's works for transportation to New York. The freight upon such shipments was paid by the plaintiff, who in turn delivered the shells to the British Government in New York harbor.

Method of Bookkeeping

For the purpose of keeping separate the profit upon said shell contracts, plaintiff opened a separate set of books, upon which it credited to an account known as "special contract account," the advance payments received from the British Government on account of said work, and from said account made all payments to sub-contractors, and other payments for expenses connected with said work, and credited to said account all money received from the British Government, and when said contracts were completed, transferred to its general books the remaining net profit in said account. As a result of this, the said net profit did not show, in any way, upon the general books of plaintiff until the profit was thus finally determined. The plaintiff charged to said special contract account the steel bars in mill lengths manufactured by it at market prices, in the same manner as if plaintiff had purchased said steel bars in mill lengths in the open market, for the reason that such work was not part of plaintiff's business. This entry of the market prices was for the purpose of determining the net profit upon all the shell contracts. Subsequently, when making its return under protest, under the law providing for munition manufacturers' tax, the plaintiff, at the request of the Department of Internal Revenue, altered the charge for steel bars in mill lengths so as to reflect the same in its return at cost price instead of market price, therefore adding to the amount upon which the plaintiff was taxed the profits shown on plaintiff's general books upon said steel bars in mill lengths. The plaintiff employed none of its capital in the manufacture of munitions, but it employed the advance payments made by the British Government. It contracted no interest-bearing debts or loans to meet the needs of such manufacture. The total net profits upon which the tax was computed were $2,162,500.96. It appears that the Westinghouse Machine Co. and the Union Switch & Signal Co., and perhaps others who furnished material or did work under the contracts aforesaid, were assessed for a munition manufacturers' tax upon the profits made by them under their contracts aforesaid with the plaintiff, and severally paid the accounts of the respective assessments.

No Intent to Evade

Plaintiff's methods of keeping its accounts, or of performing its obligations under the contracts with the British Government, are not to be deemed as evidence of any intent to evade its liability for the tax, because such methods were adopted and such course of business was begun prior to the passage of the act of Congress.

The act under which the assessment was made was passed Sept. 3, 1916, and is entitled "An Act to increase the revenue, and for other purposes," 39 Statutes 756-780. The particular parts of that act which determine plaintiff's liability upon the facts found are set forth under Title III, "Munition Manufacturers' Tax," and are as follows:

Section 301. That every person manufacturing . . . (c) projectiles, shells or torpedoes of any kind . . . shall pay for each taxable year, in addition to the income tax . . . an excise tax of 12½ per cent upon the entire net profits actually received or accrued for said year from the sale or disposition of such articles manufactured within the United States. Provided, however, that no person shall pay such tax upon net profits received during the year 1916, derived from the sale and delivery of the articles enumerated in this Section under contracts executed and fully performed by such person prior to Jan. 1, 1916. . . .

Section 307. The tax may be assessed on any person for the time being owning or carrying on the business, or on any person acting as agent for that person in carrying on the business, or where a business has ceased, on the person who owned or carried on the business or acted as agent in carrying on the business immediately before the time at which the business ceased.

If the excise tax provided for in the foregoing sections be a tax imposed upon manufacturers of munitions, can it be said that the plaintiff escaped liability under the facts found in this case? The plaintiff, by its engagement with the British Government, undertook to manufacture, or have others manufacture, the shells. It began the manufacture of the shells, to the extent of making the round bars in mill lengths. The steel in said round bars was the plaintiff's property during all succeeding processes, and until the plaintiff delivered the finished product to the British Government. If this court would hold that the plaintiff ceased to be a manufacturer when it had finished the manufacture of the round bars in mill lengths out of which the shells were made, although it retained title thereto during the processes performed by others, the construction of the law would be too illiberal, and would tend to defeat what plainly appears to be the purpose of Congress. The tax, however, is not upon the manufacturer; it is upon the entire net profits actually re-

ceived or accrued from the *sale or disposition of such articles.*

The liability for the tax is not expressly limited to the person manufacturing the munitions. It may be assessed on any person for the time being owning or carrying on a business, or on any person acting as agent for such a one. In the present case the business was carried on by the Carbon Steel Co. In fact, the entire business of furnishing the shells to the British Government, in pursuance of the several contracts, was carried on by the plaintiff. The making of the round bars was continuing long after the first slugs were delivered to the other corporations. The clerk (or clerks) of the plaintiff was stationed at the works of the Westinghouse Machine Co. and the Union Switch & Signal Co. for the purpose of checking up the work as it progressed. The case is not made any different because those companies paid the assessment upon their profits for making parts of the shells. The plaintiff was not charged in the assessment against it with any of the profits made by its sub-contractors. The tax paid by it was a tax assessed upon its profits only. In every aspect of the case the plaintiff appears to have been liable to the payment of the tax. Therefore, the plaintiff is not entitled to recover, and judgment will be entered in favor of the defendant.

Large Exports of Steel Plates and Sheets

Exports of steel plates and sheets from the United States for the 10 months ended Oct. 31 were as follows in the last three years, in pounds:

	10 Months, 1916	10 Months, 1917	10 Months, 1918
Steel plates	499,392,218	992,358,053	968,967,611
Steel sheets	196,348,363	269,762,613	323,524,627

While the exports of steel plates in 1918 have not quite kept pace with those of the year previous, those of sheets have constantly grown until last year they were two-thirds more than the exports for the same period in 1916.

It is an interesting fact that Canada and Japan have figured most prominently in the receipt of these exports. For the 10-month period in 1918 their part of the 968,000,000 lb. of plates and of the 323,000,000 lb. of sheets was as follows:

	Plates	Sheets
Canada	303,694,848	119,798,758
Japan	174,383,081	110,212,694

Japan has taken one-third of the steel sheet exports, and ranks second in the absorption of steel plates. France has been a large consumer of steel plates, having taken 154,608,762 lb. to Nov. 1, 1918. Great Britain ranks third with 137,386,245 lb. In the same periods in 1916 and 1917, Great Britain took a very small proportion of the steel plate exports. This is also true of France.

These data are compiled from the monthly official statistics of the Bureau of Foreign and Domestic Commerce.

American Iron and Steel Institute Will Hold May Meeting

At a recent meeting of the board of directors of the American Iron and Steel Institute held in New York, the resignation of Major Powell Stackhouse of Philadelphia, as a member of the board, was accepted and Charles H. McCullough, Jr., the new president of the Lackawanna Steel Co., was elected a director to succeed him.

It was decided to have the usual general meeting of the institute in New York in May and the committee on arrangements which has served so long, consisting of Messrs. James A. Farrell, James A. Burden, E. A. S. Clarke, Charles M. Schwab and John A. Topping, was reappointed to serve as the committee on arrangements for this meeting.

The following were elected the active membership in the Institute:

Orrin H. Baker, salesman, Illinois Steel Co., Chicago.

William T. Burt, auditor, La Belle Iron Works, Steubenville, Ohio.

Harry Kennedy, superintendent blast furnaces, Donner Steel Co., Buffalo.

Willis F. McCook, president, Pittsburgh Steel Products Co., Pittsburgh.

Duncan B. Palmer, superintendent blooming and bar mills, La Belle Iron Works, Steubenville, Ohio.

Philip M. Guba, manager sales, Donner Steel Co., New York.

The following were elected to associate membership in the Institute:

Nathan H. Gellert, Gellert Engineering Co., Philadelphia.

Howard R. Kiroock, president, Hudson Sheet & Tin Plate Co., New York.

Thomas W. Pangborn, president and treasurer, Pangborn Corporation, Hagerstown, Md.

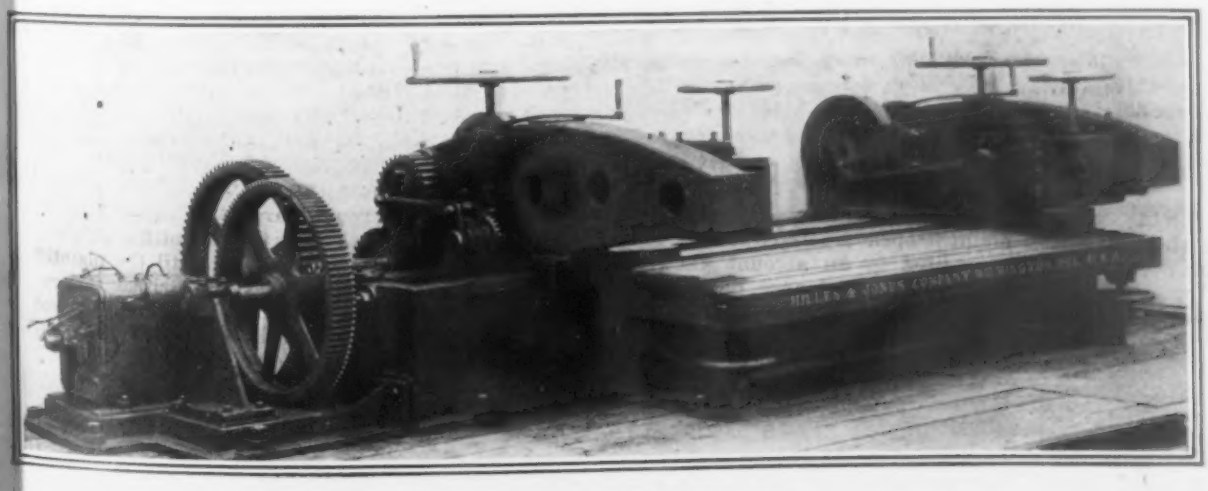
Albert H. Hudson, purchasing agent, American International Steel Corporation, New York.

Ship Plate Scarfing Machine

A machine with a draw-knife shaper action designed for scarfing simultaneously both corners of a plate has been placed on the market by the Hilles & Jones Co., Wilmington, Del. The machine is built in different lengths to provide for working plates from 7 in. to 10 in. wide. The table for holding the work is made adjustable so that angles for scarfs of various lengths can be cut.

Saddles carrying the cutting tools are adjusted by hand wheels and a power feed is provided giving automatic feed motion for each tool. The stroke of the cutting tools is variable from 6 in. to 18 in., with a quick return, accomplished by means of cut elliptical gears on the crank shaft. A lever with clutch is provided for throwing the cutting tool out of gear when the machine is running.

For driving, an adjustable speed 15 hp. motor is recommended. The cutting speed is controlled by the speed of the motor and is variable from 9 to 18 strokes per minute.



Machine Designed for Rapid Ship Plate Scarfing

MAGNESITE AND ZIRCONIA

German Standardization and World Output of the Former—Brazilian Zirconia and Others

A series of conferences has been held recently in England in the various centers of production by the Refractory Materials Section of the Ceramic Society (British). They have stimulated interest in a subject of great importance to the iron and steel and the non-ferrous industries. At one of the conferences the magnesite and zirconia as refractories were discussed. According to the London *Times*, the following points were brought out:

The utilization of crystalline magnesia for refractory purposes is not a recent discovery, but it was left for German interests to exploit the great Austrian deposits and, by the creation of a sound business organization allied to scientific and technical investigation of the subject, to create a monopoly in the world's metallurgical requirements for this material. T. Crook, in presenting an exhaustive review of this subject, said that of the various factors which have contributed to the success of the enemy industry, one of the most important has been the careful standardization of the finished products, such as can be attained only by dressing the raw magnesia and dead burned magnesia so as to yield materials of steady quality. The three main varieties of magnesites are the Styrian, which is spathic breunnerite, the spathic magnesite which is obtained from the United States and Norway, and compact magnesite, the chief desposits of which are in Greece, California, Italy, India, and Australia.

World's Output of Magnesia

The fluctuations in output during recent years are shown in the following table, quoted by the author, the remarkable features of which are the rise in the Canadian and American production:

World's Output of Magnesite (in Metric Tons)

	1913	1914	1915	1916
Austria-Hungary	200,947	.....	.....	.....
Greece	98,517	136,701	159,981	199,484
United States	8,741	10,248	27,669	145,167
Italy	600	1,410	9,200	18,252
Canada	467	325	13,411	50,284
India	16,462	1,708	7,572	17,928
Australia	7,220	2,056	1,647	4,084
Union of South Africa	403	319	569	553

The dominant features in the pre-war situation were the cheapness of production and transport of the pure Grecian product, and the good quality and cheapness of the Austrian product, which consisted of sintered magnesia. The United States before the war took 56 per cent of the Austrian imports, Great Britain 17 per cent, and Germany 14½ per cent. In future years it is probable that Canada will be able to export as well as supply her own needs. Mr. Crook pointed out that bricks made in Great Britain from Grecian sinter were not only very costly, but inferior to the Austrian bricks, which users would still prefer if they could be obtained.

Zirconia in Brazil and the United States

In an interesting contribution on the occurrence and applications of zirconia, which are now numerous, H. C. Meyer dealt with the recent progress of this branch of the industry in the United States. The Brazilian deposits are the most important from the commercial standpoint, and are probably of vast extent. They are zirconium ores, but, in addition, use is made of two zirconium-bearing minerals, brazilite and zircon. There are several important deposits of the last-named in various parts of the world. The remarkable heat-resisting qualities of zirkite commend it as a refractory of the first order. Its high melting point, low co-efficient of expansion, and low thermal conductivity make it an ideal lining for electric furnaces of either the arc or the resistance type. The disadvantage is that the initial cost of the zirkite lining is high as compared with magnesite brick, but this is probably more than offset by its superiority as a refractory.

Many difficulties attend the manufacture of zirkite brick because the material has little or no plasticity. Experiments have shown, however, that success largely depends on the selection of the proper binder, although the high percentages of silica and iron oxide also play an important part in the behavior of the material when subjected to high temperatures. A satisfactory commercial process has now, it is stated, been evolved, and the bricks are finding wide application in the United States for lining electric furnaces.

Over-Production Not to Be Feared

The assumption that there is only a limited amount of business to be done and never enough for all is an error responsible for infinite mischief, according to George E. Roberts, assistant to the president National City Bank, New York, in an address before the Investment Bankers' Association of America at Atlantic City, N. J., Dec. 10. It is a mistake, he says, to emphasize the language of warfare in describing trade rivalries as though the success of one nation depended upon driving another out of the field.

He pointed out that the chief grievance alleged against the labor organizations is that they sometimes limit the output, acting upon the theory that there is only a limited amount of work to be done, and that it is to their interest to make it go as far and pay as much in wages as possible. Every such conception of industry and business, he asserted, is fundamentally wrong. There is no limit to the amount of work to be done or the amount of business to be had, because there is no limit to the amount of wealth that may be created from the resources of nature, or to the consumptive demands of the world's population.

"Can anyone think in this age that there is danger of general over-production of the commodities of trade? The people of the United States live upon a level of comfort above that of any other people in the world, and yet the average family in this country lives far below the level of its wants and its commendable aspirations. In this day of free schools, of cheap printing, of democratic ideas, the wants of the people develop faster than their ability to supply them, and hence we have a growing discontent which threatens the very foundations of the social order. The spirit which finds its blind expression in Bolshevism has its inception in the desire for better living conditions, and it is an affront to that spirit—and an affront to common sense—to conduct the international policies of nations upon the theory that the chief danger to be averted is that of over-production. Such an argument amounts to a confession of ineffectiveness or non-achievement in the industrial management of the world, and affords a basis for challenging the existing order."

A course on the Human Side of Engineering, for colleges, has been outlined by Industrial Service Movement, 347 Madison Avenue, New York. It is designed to give instruction in: (1) Human factor in industry; (2) evolution of the individual worker; (3) influence of the modern factory system on the worker; (4) human factors in production, including working conditions, housings, savings, etc.; (5) ethics of engineering and business; (6) employment management, vocational guidance and the education of employees; (7) co-operative organizations; (8) legislation and public opinion on industrial questions; (9) programs of typical companies for effecting industrial betterments; (10) scientific management in its human relations; (11) handling intelligently of employees; (12) engineer's responsibility for service; (13) readjustment and reconstruction. Fred H. Rindge, Jr., is secretary of the organization.

The compensation committee of the Chicago chapter of the American Association of Engineers will report at the regular meeting Friday, Feb. 7. A paper will be presented by J. H. Prior, formerly chief engineer Illinois State Public Utilities Commission, followed by a discussion prepared by Langdon Pearse, engineer Sanitary District of Chicago. The committee is considering tables of minimum salaries for engineers.

Club for Westinghouse Employees

In the completion and formal opening of the Essington Club another provision has been realized for the comfort and the convenience of Westinghouse employees at the Essington works, South Philadelphia.

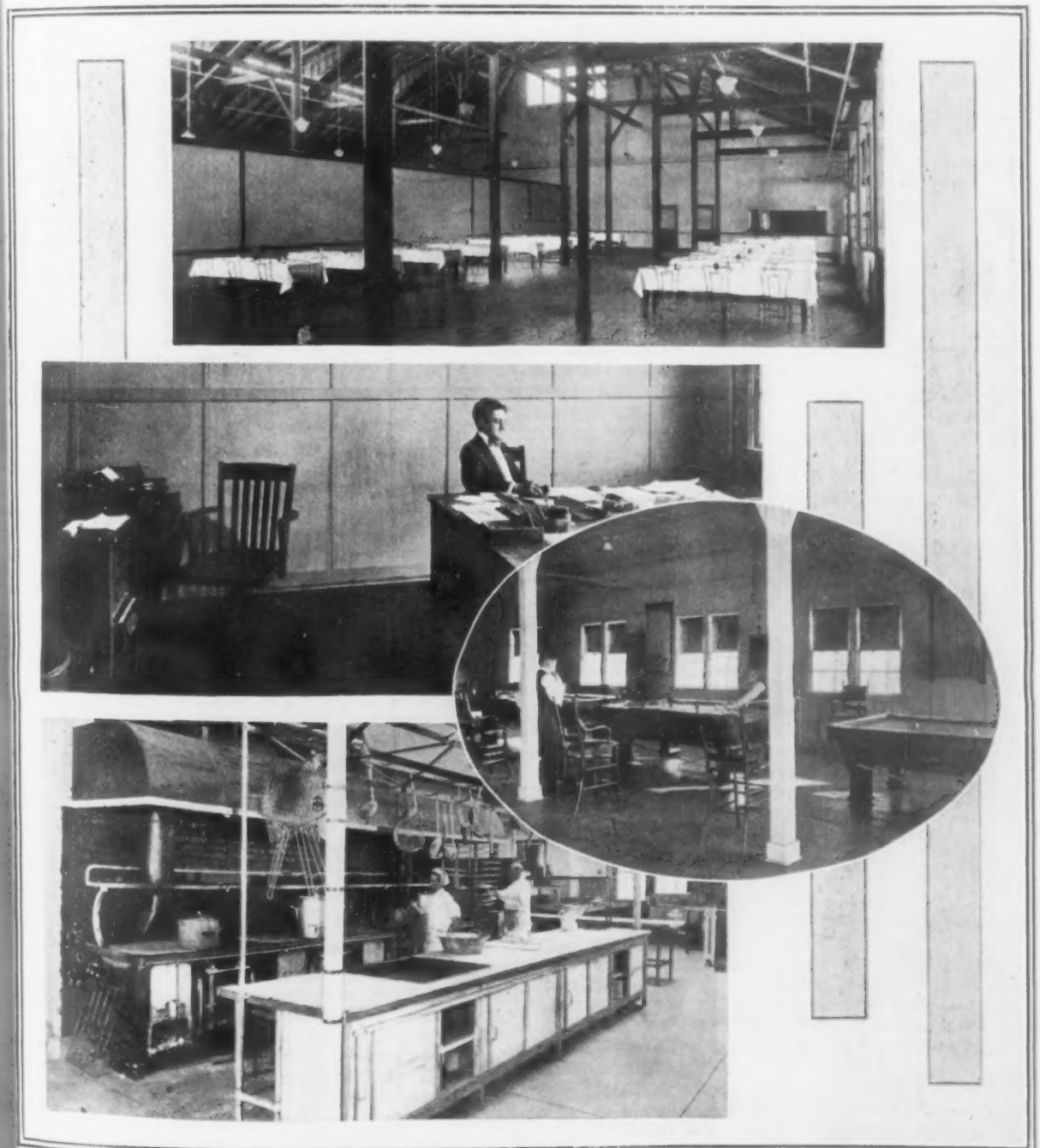
Owing to the lack of rooming and boarding accommodations, the Westinghouse company made arrangements last spring with the Emergency Fleet Corporation by which housing accommodations were to be erected by that company. On account of the prevailing conditions in the building trade progress in the erection was delayed.

The club is located on the Tinicum road, facing the Delaware River, in one of the most picturesque parts of Essington. The structure is built in the shape of a fan, consisting of seven sections, two stories high, with total accommodations for 500 guests. The center of the seven sections is occupied by the two large dining halls, kitchen, offices, lobby and porch. Immediately adjoining the lobby on each side are the recreation rooms, such as library, reading room, chess, checker and card room, billiard room, music room and lounging floor. Three wings of the fan are set aside for the bedrooms, a large number having a river bank exposure with a panoramic view across the Delaware River. The club has its own steam heating and lighting plant. Distributed in the buildings are 45 showers and 30 individual baths. Two classes of sleeping accommodations are provided. In one the guest has his own room completely furnished, whereas in the other the sleeping quarters are divided into separate wards.

The kitchen contains every modern, up-to-date convenience, and first-class service will be the aim. In one dining hall meals will be served at tables and in the other a quick service system has been established.

The welfare department of the Essington works is arranging for concerts by the Westinghouse band, social entertainments, scientific and illustrated lectures, and will provide magazines, daily papers and trade periodicals. In the recreation halls will be pianos, victrolas and player-pianos. The river front is to be transformed into a park with boat landings and camp buildings for the accommodation of canoe and fishing clubs.

The operation of the establishment is in charge of a special management. The service force is supervised by H. M. Larson, formerly manager of the Utah Copper Hotel, Utah. The quarters for employees of the club will occupy a separate building.



The Essington Club Aims to Give Westinghouse Employees All the Comforts and Conveniences of a First Class Hotel

Safety and Economy in the Boiler Room

Practical Suggestions for Reducing Hazards and Increasing Efficiency—Thorough Inspections and Careful Training of Men Required

BY W. E. SNYDER*

THE boiler plants referred to in this discussion are those of blast furnaces, large steel works and other large heavy manufacturing plants. The efficiency of such boiler plants will range from 50 to 60 per cent, sometimes it is under 50 per cent and sometimes it may run as high as 65 per cent. The plants contain from 5 to 30 boilers, of from 200 to 300 hp. rated capacity each, in some plants as high as 500 hp. per unit. The firing is done by hand on flat grates; or chain grates, or inclined grate stokers are used. The boilers may have been in service 8 to 25 years, with different types and sizes in one boiler plant.

Where the plant has reached an age that its replacement is necessary the problem is not so difficult, for the reason that modern boiler plants can be installed which are economical in labor and efficient in the use of fuel. However, even in such modern boiler plants, the problem of operating the boilers at high efficiency is a difficult one, owing to varying manufacturing conditions which cause the steam demand to fluctuate widely and the low grade labor available; but it is with the older boiler plants mainly that this discussion has to do—plants that are too good to be replaced, and yet of such character that their efficiencies are low.

SAFETY FEATURES

During the past few years owing to the development of safety work in manufacturing plants, the safety features of boiler plants which are necessary to their proper operation have become more standardized. It may not be amiss, however, to mention here briefly some of the most important safety features of boiler plants, keeping in mind the fact this discussion applies mainly to existing plants of the older type.

Boiler and Piping System Inspections

First and most important is boiler insurance, with the incidental inspection by trained boiler inspectors. It is perhaps unnecessary to argue in favor of boiler insurance at this time, as all large companies with which I am familiar carry it. Next in importance to these regular inspections are the local inspections which should be made by some designated engineer or experienced mechanical man connected with the operation of the boiler plant. Such inspections should be made much more frequently than the inspections of the insurance company's representatives and should cover all of the conditions of the boiler, its setting and piping, etc., which have to do with both safety and economy. The local inspector should write a complete memorandum of his inspections, giving the date and the number of boilers even though there is nothing special to report. Such a memorandum is of great advantage in case an accident occurs and it becomes necessary to make a thorough investigation.

Next in importance to the inspection of the boiler and its setting by the local inspector, should be his inspection of the feed, blow-off and steam piping system. Such an inspection does not need to be made as often as a boiler inspection, possibly once a year is often enough for a complete examination. It should also include the different valves and their condition. In such inspections of piping we have found and removed a large number of dangerous features, such for instance as cast iron sections in main steam lines and in feed lines; copper bends, corroded threads on blow-off connections; 10-in. and 12-in. steam pipes with threaded end and blank flanges screwed on, so that the full steam pressure acting on the flange had to be borne by threads cut years before; thin flanges, out of all proportion to the pressure carried; flanges in which some of the holes did not coincide, and two or three bolts were left out, etc. These and various other defects, too numerous to mention, often times hidden by pipe covering, are revealed by systematic inspection of piping.

Safety of Stairways, Boiler Parts and Accessories

A proper system of stairways and operating platforms, with railings and toe boards is absolutely necessary to good operation. It is not possible to make detailed suggestions in a matter of this kind, because the local conditions are different in every boiler plant. It should be kept in mind, however, that stairways are necessary for easy and quick access to the parts of the installation above the floor level, and that these stairways should be arranged so that it is hardly possible for a man to be trapped in case of an accident, with no means of getting down to the floor. The platforms and walks should be planned so that all the main valves, water columns, man-holes, cleaning doors, etc., are easily accessible. This is necessary, not alone from the standpoint of safety, but to insure reliability and economy in operation.

Most of the older boilers were constructed with cast iron parts, such as mud drums, headers, and pipe connections. It is not always possible to eliminate the risk incident to the use of cast iron, but it can be minimized. Wrought steel mud drums are now made which it is practical to attach to older boilers and which are entirely safe. Wrought or cast steel headers can also be used to replace cracked cast iron headers, though a broken header is not usually a serious matter like a cracked cast mud drum. Where the flanged connections on a boiler are subject to heavy strains, such as may be due to the connection of main steam pipes, safety valves, etc., the cast iron can be replaced with cast steel. Of course, it requires the use of judgment and common sense in deciding how far to go with the replacement of cast iron in boiler plants which have been in service a number of years, as it depends on the condition and probable remaining life of the boilers and whether there is any apparent weakness. In my opinion cast mud drums ought to go first, if there is a possibility of continuing the boilers in service for even a few years.

Automatic or so-called non-return valves are important safety features of any boiler plant. This type of valve, together with a gate valve placed between it and the main steam header, with proper prevention of water pockets, makes a very good and safe arrangement. The automatic valve closes in case of accident to the boiler, thereby isolating it from the remainder of the steam system. The use of the non-return valve also avoids the necessity of having a man on top of the boiler while it is being "cut in." I have known a serious and fatal accident to result when boilers were connected to the line, due to the accumulation of condensed steam in the branch pipe forming a water hammer when the valve is opened and knocking the side out of the valve or a fitting.

Feed water regulators are important adjuncts to the operation of boilers. The most satisfactory type adjusts the valve to any position between closed and wide open, so that the water admitted to the boiler is always just sufficient to supply the quantity leaving the boiler as steam. The function of the regulator is to relieve the water tender of the detail of continually

*From a paper, "The Practical Operation of Industrial Boilers," presented at a meeting of the Engineers' Society of Western Pennsylvania, Pittsburgh, Jan. 21. The author is mechanical engineer, American Steel & Wire Co.

adjusting feed valves, a no small task in a boiler plant having from 10 to 20 boilers. The water tender is always an experienced fireman and he should combine the supervision of the fires with that of the water levels. This he can do the more easily when the feed water regulators control the supply of water to the boilers. It is perhaps unnecessary to add that each boiler should be equipped with the best water columns obtainable, and that these columns have gage glasses and three try-cocks, operated by rods or chains from the point most convenient for the water tender. We have by the use of high grade gage glasses divided the former number of breakages by 8, averaging for a whole year throughout a large number of plants. This, of course, reduces the liability to serious accident in the same proportion and the proper use of guards still further reduces the average.

In order to protect the boiler properly, the safety valves should have sufficient capacity to discharge the full quantity of steam which the boiler will generate with the main steam outlet closed. Safety valves as now manufactured have a guaranteed discharge capacity under specified conditions, and in this way, it is possible to be sure that there is enough of valve area on every boiler to make the conditions safe. Also, the valves should be tried every day in order to be sure that they work freely.

Economy in Operation

During the past two years a great deal has appeared in the technical press, and in papers before engineering societies on the subject of fuel economy. The intention of the writers is good and much of the discussion is helpful, but my criticism has always been that this discussion is usually too academic and does not get at the real heart of the matter, by failing to give proper importance to the training of the operating man of the plant. The assumption seems to be that the superintendent of the works has the power to create to order an operating crew for the boiler house which will only make it necessary to post a series of typewritten rules in a few conspicuous places to insure safety and high efficiency. As a matter of fact, many boiler plants are operated under the charge of boiler house foremen who used to be water tenders, and are still water tenders in their knowledge of the work, with enlarged duties. The water tending is done by men who used to be firemen and the firemen were formerly ash men or flue blowers, most of whom have been recruited, not very long before, from the ranks of laborers. In their work they have acquired a certain familiarity with the stokers and boilers and pipes and valves, etc., with which they have to deal, but they have practically no knowledge of the methods of operation which it is necessary to follow to save fuel and labor.

There is no use in becoming disgusted with the general intelligence of such a boiler house crew and firing them all out. This would only result in getting together, after much effort, another and different set of men, with about the same general characteristics and abilities. We know how to set boilers properly to use coal efficiently; the problem is to operate the boilers, day after day, so that present day engineering knowledge will be utilized by the men directly in charge. The boiler crews must be trained and the problem is how best to accomplish this training. In order to make some useful suggestions on this point, it is necessary to discuss briefly the losses of fuel or heat which take place during combustion.

In general it does not pay to use the so-called ¾-in. screened coal, which costs more than the straight run of mine. Coal for chain grates and inclined grate stokers ought to be crushed so that the largest lumps will pass through a 1-in. ring, and then the fuel burns out uniformly by the time the fire reaches the back end of the grate. The best way to prepare coal for furnaces of this kind, at a plant where there are gas producers, is to pass the run of mine coal through a coarse crusher so that the largest lumps are broken down to a size of 4-in. or 5-in. cubes, then pass the crushed coal over a rotating or shaking screen of about 1-in. or 1¼-in. mesh. In this way the screening is far more effectively done than it is when passed over an inclined bar screen. All the coal that goes through the screen is the kind best adapted to boilers while the coarse coal that goes over the screen is just right for gas producers, locomotives and miscellaneous hand-fired furnaces.

Reducing Heat Losses

The most important step in improving boiler economy is a reduction of the heat lost up the stack which will vary 15 to 35 per cent. The most important work of the firemen in reducing this waste is to keep the grates evenly covered with a fire thick enough to utilize the oxygen in the air coming through, the best condition having been determined by analysis of the flue gas; also having the furnace doors open as short a time as possible when firing coal or working with the fires. The leakage of air through any opening in the setting other than those into the furnace proper is an especially bad combination. There is a variety of compositions on the market used for coating over the brick work itself to make it impervious to air, but we have never derived any benefit from their use. It is entirely practical to plug permanently the small openings and cracks in the brick work through which air can pass into the setting. Ill fitting cleaning doors have the same harmful effect as any other openings into the setting.

The total sensible heat carried away in the products of combustion is due to their temperature above that of the entering air. This waste is increased by the gas passages through the boiler being too direct; by holes in the baffling; dust on tubes and other heating surfaces; dirt and scale inside the boiler, too much forcing, etc.

For the gas passages being too direct, the design is responsible and not the operating men. If it is not possible to put in additional baffles, it is necessary either to run the boilers as they are or install economizers.

The development of mechanical flue blowing equipment is a splendid improvement. The use of mechanical flue blowers not alone keeps the heating surface cleaner than hand blowing, but it avoids opening the doors of the setting frequently. Also these doors never fit tight and the cracks around them have to be refilled every time they are used. The tubes often become coated with a thick layer of very fine dust, tarry or sooty deposit, which it is not possible to blow off. Joseph Harrington, engineer, Chicago district, United States Fuel Administration, recently sent out a letter stating that this deposit can be completely cleaned off by the use of common salt. For an ordinary boiler, two or three large shovels full of salt are thrown over the top of the fire and the furnace closed up. It is said that this completely cleans the heating surface, and that two years' use had caused no harmful effects whatever. Of course, this treatment does not have to be used every day, but only when the condition of the tubes indicates the presence of the deposit mentioned.

There is not much excuse now for dirt and scale inside of a boiler. Where it is necessary to use water that is permanently bad, either due to acid, or suspended or scale forming matter, a water purifying plant is the only solution. However, even with a water purifying plant, some scale will form in the tubes, but there are thoroughly good turbine tube cleaners now made with which it is possible to clean the tubes completely; the only thing necessary is to be sure the cleaner is the right size for the tube.

Coal Moisture and Firing Problems

Moisture in the coal as it comes from the mines varies considerably, but for a number of mines in the Pittsburgh vein this ran about 1.4 to 2.9 per cent, from a number of mine samples taken. From mines in other seams of this district, it ran from 3½ to 10 per cent. What it is when delivered at the boiler house depends on the time it was in transit and the weather conditions, but it usually contains more than the mine moisture. Additional moisture is often added

(*Continued on page* 345)

BETHLEHEM STEEL PROSPECTS

President Grace Says Shipbuilding Will Be an Important Factor This Year

At a meeting of the board of directors of the Bethlehem Steel Corporation last week, it was announced that unfilled Government orders, including ships, on the books of the corporation on Jan. 1 were estimated at from $300,000,000 to $350,000,000. These undoubtedly will not suffer cancellation. They include shipbuilding work for the navy and for the Emergency Fleet Corporation. President Grace made a statement in which he said that while the returns on shipbuilding contracts are but a small percentage on the cost, the large volume of this business should insure substantial aggregate earnings for the coming year and afford an element of stability to the operations of the corporation independent of the business conditions in the general steel trade. He added:

"It is our opinion that for the immediate future there will be no large buying movement in the steel market. The whole country must stop and take an account of stock, so to speak, and start anew, putting our whole economic structure on a normal peace-time basis. We should then see again a period of unusual prosperity supported by an era of construction.

"During the year there was expended for extensions to plant $27,866,000, leaving $20,000,000 to be expended during the year 1919 to complete the corporation's construction program. This expenditure is mainly for the completion of the commercial steel plant at Sparrows Point, Md., which will result in making productive new and additional steel capacity, representing an investment of $50,000,000. This will give to the Bethlehem Steel Corporation an annual capacity for steel output of more than 3,000,000 tons, with finishing plants of sufficient capacity to convert this entire tonnage into commercial products, thus completing our provision for the great reduction in Government orders and the practical cessation of the manufacture of munitions."

Mr. Grace stated that the corporation produced 60 per cent of the guns, 65 per cent of the gun forgings and 40 per cent of complete ammunition made in the United States. During the war it shipped to our Government and the Allies the following:

Finished guns	3,570
Forgings for guns (shipped for assembling in other plants and arsenals, largely in France), 63,027,197 pounds, equivalent in finished guns to about	11,000
Finished gun carriages, limbers, and other vehicles	7,582
Finished naval gun mounts	599
Complete field gun ammunition, rounds	18,477,876
Projectiles for ammunition	1,710,579
Air flask forgings for torpedoes, pounds	9,517,311
Armor plate, pounds	69,409,533

The corporation sent sufficient gun forgings to the French for the latter to assemble 900 completed guns a month; ammunition shipments averaged 1,000,000 rounds a month; they delivered an aggregate of 625,000 deadweight tons of merchant shipping, 16 submarines, 26 torpedo boat destroyers and have launched and fitted out for early delivery 36 additional destroyers.

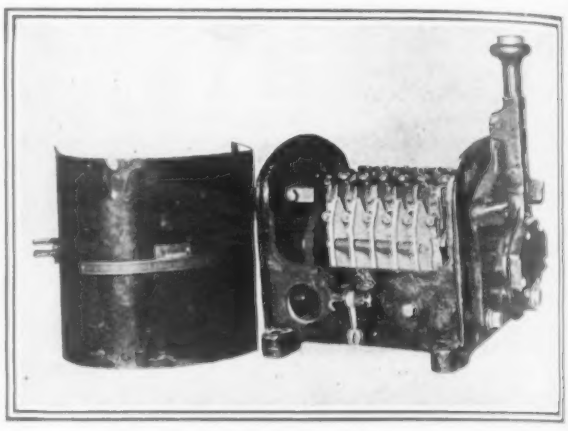
The board of directors declared the full year dividends on the 7 per cent and the 8 per cent preferred stocks, and quarterly dividends on the common, equivalent to 10 per cent yearly. The gross business for 1918 has been estimated at $448,000,000 which may be compared to that of 1905, the first year in which the corporation operated, when the amount was $10,000,000. The net earnings, after deductions for depreciation and amortization due to the abnormal conditions resulting from the war, amounted to about $16,000,000, representing a profit of about 3.5 per cent on the gross shipments, as compared to a profit of 9.14 per cent in 1917.

The board adopted resolutions on the death of George R. Sheldon, a member of the board since the formation of the company.

On Feb. 1 the office of the purchasing agent of the Elk Horn Coal Corporation will be transferred from Wayland, Ky., to Wheelwright, Ky.

Master Controller for Mills and Cranes

A multi-speed full reverse master controller for use with automatic magnetically-operated controllers has been developed by the Cutler-Hammer Mfg. Co., Milwaukee. This master is smaller than previous designs and is especially applicable in connection with steel mill and crane controllers where the operator's attention should not be diverted from the work or machine and where space is limited. An internal gear drive, entirely enclosed but readily accessible, eliminates the liability of accident to operators through the catching of fingers or clothing in the bevel gears usually employed in types with straight line drive. This controller may be mounted horizontally or vertically, the former permitting straight line movement of the handle and the latter, a radial



Master Controller Designed for Safety in Operation and Accessibility of Parts

movement. A centering latch operated by a button in the handle indicates to the touch the "off" position of the master, while a strong notching spring is used to indicate the five positions in either direction. A maximum of 12 fingers may be mounted on the fingerboard, using 6 in one direction or rotation and 6 in the other.

The new controller is so designed that by the removal of two bolts the entire fingerboard may be taken from the frame, while the removal of three bolts allows the entire shaft and contact fingers to be withdrawn. The fingers and segments are clamped to insulated steel shafts, and adjacent contact points are separated from each other by arc barriers.

Safety Codes to Be Issued by Labor Department

WASHINGTON, Jan. 28—The Working Conditions Service of the Department of Labor has announced a program of safety work which it plans to study during the coming year in co-operation with the Bureau of Standards. The chief item is the establishment of codes, including the following industrial problems:

Plant arrangement, including routing of material and product, design of buildings and layout of plant; yard entrance and exit gates, roadways and walkways, railroad tracks, material piles, clearances and illuminations; fire hazards, including fire fighting equipment, water mains and hydrants, spacing between buildings as related to occupancy, and arrangement of yard material as related to occupancy of buildings. Also building equipment; fire prevention and protection; elevators; cranes and derricks; conveyors and conveying machinery; steam engines and turbines; hydraulic machinery; oil and gas engines, etc.

The Aluminum Rolling Mill Co., Cleveland, has placed in operation its new plant on Ivanhoe Road, adjoining that of the Cleveland Metal Products Co. The building is approximately 90 x 350 ft. and is equipped with one furnace with a melting capacity of 8000 lb. and six stands of rolls. The company will refine aluminum and roll aluminum sheets in all sizes. Its capacity is 300,000 lb. per month, but the plant is laid out with a view of making large extensions and greatly increasing its present capacity. The plant is under the management of D. R. Yolton.

Unemployment Problem Worries Washington

Absence of President Wilson and Samuel Gompers Causes Officials to Hesitate—Employers' Commission Will Study Conditions in Great Britain

WASHINGTON, Jan. 28.—The labor situation, with its increasing unemployment, its threat of lower wages and of factory shutdowns, with a general spread of unrest and strikes and a background of Bolshevist politics—overshadows all other Government worries here. No real solution, however, is being attempted, chiefly because of the absence of President Wilson.

Reports from all over the United States indicate an alarming increase in unemployment, without any compensating increase in industrial activity. On the contrary, reports from all districts indicate a decreasing operation of plants. To make matters worse, strikes are breaking out in vital points and the general situations have become so brittle that the Department of Labor officials are seriously worried.

From time to time, suggestions are made in Washington for a conference of employers and employees to attempt a peaceable solution. So far these suggestions have come to nothing. The labor officials insist that wages must stay up until the cost of living has been reduced. In the meantime, the demand for all products has been decreasing although it has been unaccompanied by a general decrease in prices.

Conference Not Called.

Apparently, the reason no such conference has been called is the absence from the United States of President Wilson and of President Gompers of the American Federation of Labor. Without these two, the officials left in Washington hesitate to undertake anything that might pledge either the Government or the labor unions to a future policy.

The statistics compiled by the United States Employment Service are beginning to reveal something of the real seriousness of the situation. For weeks they have shown a steadily increasing surplus of men out of work. The figures, themselves, are still far behind the actual facts. But the situation grows worse even more rapidly than they would show. They are made up from fragmentary telegraphic dispatches covering in each city only a portion of the industries and with little apparent attention to the thousands of unemployed who walk the streets, but whose demand for employment is not registered by the industries that report.

Twenty states now report a surplus of labor, totaling 210,000—against a surplus of 12,000 reported Dec. 1. To show how rapidly these figures have grown, the same statistics Dec. 10 reported 25 per cent of the cities on the list as having a shortage of labor, 12½ per cent reported a surplus, and 6½ per cent reported that the supply equalled the demand. The latest reports show that only 13 per cent of these cities now have a shortage of labor, 44 per cent report a surplus and 43 per cent declare the supply equals the demand.

In a survey of the States, Connecticut reports an increasing surplus of unemployed. Only New Britain continues to report a slight shortage. The Labor Department officials in that State hope that the resumption of building in the spring will be of relief by increasing the operation of the plants producing builders' hardware. Massachusetts reports a surplus of 11,000 machinists, as well as 700 factory hands and 3,000 boot and shoe workers. Boston, Worcester, Lynn and Lawrence all report long lists of unemployed.

Heavy surpluses of labor are also reported in New York, Rochester, Syracuse, Utica, Buffalo and Albany. The worst condition in New York centers in New York City, where thousands of discharged soldiers are in the streets looking for work. The same condition is reflected throughout New Jersey, particularly in Trenton, Paterson and Elizabeth.

So far Pennsylvania has been the only state in the East which has been able to absorb labor. But its shortages have almost disappeared. Only Pittsburgh and Scranton still have unfilled labor jobs. The shortage at Harrisburg and Philadelphia has disappeared entirely and they now report a surplus of labor. So does Erie.

Worse Conditions in Ohio.

Ohio continues one of the most difficult states and the condition there is steadily growing worse. Cleveland's surplus of 40,000 has jumped to 55,000. Toledo reports a surplus of 10,000 and Dayton a surplus of 7,000. Cincinnati and Youngstown both report surpluses. Surpluses are reported in all centers except in Akron and Columbus, where the supply about equals the demand.

The surplus in Detroit of 25,000 reported last week has increased to 30,000. Grand Rapids, Jackson and Flint all report surpluses. There is a demand for woodsmen and a heavy surplus of bookkeepers and clerks. Illinois reports surpluses at almost every point. The expected layoff in the Rock Island Arsenal will affect both Illinois and Iowa. In Indiana heavy surpluses are reported except in boilermakers and machinists. Indianapolis reports a surplus of 4,400. Minneapolis, Minn., reports a surplus of 4,000. There is a surplus of high class engineers, clerical help and in the building trades. There is a slight demand for machinists. In the copper districts, the conditions are serious.

Copper producers are unable to market any considerable portion of their output, with the result that mines and smelters are being closed down and men laid off every day. Butte, Montana, reports a surplus of 10,000.

In Alabama there is some demand for miners and agricultural help. In Georgia there is some shortage in Atlanta and Savannah, but taking the state as a whole there is a surplus of all classes of labor.

The Pacific Coast situation is bad. Heavy surpluses are reported in San Francisco, Oakland and Los Angeles. San Francisco reports a surplus of 8000. Laborers and returning soldiers seem unwilling to leave the city. The labor situation in Oregon, especially in Portland, is acute. Portland reports a surplus of 7000. In Washington there is great unrest in the shipyards at Puget Sound, with a substantial surplus of workers over demand all over the State.

Reports of conditions from other sources than the Department of Labor paint the situation in far darker colors. Senator France of Maryland told the Conference Committee on the census bill that his information convinced him that close to 1,000,000 men are out of employment in the United States to-day and that the completion of demobilization would leave 2,000,000 men without work.

Demobilization Progressing

Demobilization in the United States has now passed the 900,000 mark and within a week should go far beyond 1,000,000. As a result of heavy pressure upon the War Department, Secretary Baker has ordered the retention of men in the service who are willing to state in writing that they cannot find employment. No statistics are available, however, as to the extent to which this will keep men in the cantonments. The order is of far-reaching importance and is likely to cause a considerable check in demobilization if the soldiers learn that the industries are already overcrowded and that the possibility of finding a place is precarious. The order follows:

In connection with circular No. 23, War Department, 1919, commanding officers will take steps to insure that every en-

listed man in their command understands thoroughly that the War Department does not desire to discharge any soldier who cannot secure civil employment. It will be made clear to every soldier that in place of being discharged as he would be normally under orders for demobilization, he may remain in the military service upon his own written request until such time as he can secure employment. The fact that he requests to remain in the Army temporarily does not in any way operate to compel him to remain in the service for a long period of time against his will. Any man who would normally have been discharged had he not expressed his desire in writing to remain in the service, may thereafter be discharged from the service at his own request, whenever he thinks he may secure employment. All men who are retained temporarily under this authority will be attached to the most convenient unit and where their services will be most useful.

An employers' commission has been designated by William B. Wilson, Secretary of Labor, to study labor conditions and governmental labor policies in Great Britain. The commission consists of Dorr E. Felt of Chicago, connected with the machinery industry; R. J. Caldwell, New York, textile industry; W. H. Ingersoll, New York, watch industry; Eldon B. Keith, Boston, shoe manufacturing industry; R. R. Otis, Atlanta, building industry; and E. T. Gundlach, Chicago, publishing industry. The commission will be accompanied by an economic adviser, Dr. Royal Meeker, Commissioner of Labor Statistics, and also by James R. Hawkins of New York, as fiscal agent; George E. McIlwain of Boston, as secretary; and Benjamin M. Squires of New York, Edgar N. Phillips and John A. Witt of Chicago, as assistants. O. F. L.

Judge Gary Says Put Men to Work

Judge E. H. Gary, in an interview published by the New York *Tribune*, Jan. 27, deprecated any suggestion that the country is facing a serious unemployment problem. On the other hand, the country is on so prosperous basis that it does not need any "booming," he said.

"Why should there be any talk about unemployment?" said Judge Gary. "The country never was more in need of its workers than it is now, and it will use all the workers it can get. I don't think there is going to be any permanent or menacing unemployment problem.

"Our country never has been so prosperous as it is now. We have resources of 15 billions of dollars annually coming out of the ground—more than we ever had before; we have more than 16 billions of cash in our banks; we are a creditor nation to the extent of 15 billions or more, and our per capita wealth has jumped up to $56, as compared to $35 before the war. We are in an era of prosperity hitherto undreamed of.

"What we need is simply to get to work and not talk about unemployment. Psychology has a good deal to do with it. Pessimistic talk will do more to bring about unemployment than it will do to prevent it.

"But there isn't going to be any. Our men who have been fighting abroad will be taken back into industry just about as fast as they return. Of course, there may be a little talk here and there about a few not being able to find employment, but this will not be serious."

"Do you think the business men of the country should begin doing business on a large scale, so as to tide over any period of depression, as suggested by Secretary of Labor Wilson?" Judge Gary was asked.

"We don't need any booming," he replied. "Business will take care of itself. This time of the year is always cleaning up time. It is not necessary for industry to do more than the demand requires. Business is going to boom itself without any help from anybody. There is no doubt about that.

"I do believe that all the public improvements that have to be done should be done now. Men should be at work all this winter on the roads that are to be built in the Southern States. The Government should begin the great reconstruction work necessary on the railroads of the country, and wherever there is public work to be done it should be done without delay.

"As for the steel industry, we are not thinking of any depression. We had a great many men in the war, and we are taking them back to work as fast as they return."

Judge Gary's attention was called to a report that Theodore P. Shonts, in order to reduce the number of unemployed in New York, had agreed to employ 1000 men in cleaning up and painting the subway and elevated stations.

"That is the sort of thing to do," said Judge Gary. "If everybody did what is to be done there wouldn't be enough men to do the work."

National War Labor Board Defines Policy

WASHINGTON, Jan. 28—The National War Labor Board has found it difficult to avoid appearing to violate its expressed policy of not attempting to force employers who had not done so before the war to accept unions.

The issue was raised anew in the complaint of the employers of the Omaha & Council Bluffs Street Railway Co., where the union officials protested because the company, in accordance with a previous order of the board, had refused to deal with the union as such. The board has made public the following ruling to modify the full vigor of its previous insistence on the stability of the open shop where it existed before the war:

"This company is now conducting an open shop in which union and non-union men are employed without discrimination. The rules of this board require that no obstacle or interference should be offered by the company to the organization of the men in the unions, or the affiliations of the local union with a national union. The rules of the board permit an employer to insist that in the negotiations between him and his employees he may deal only with his employees, and only with representatives of his employees who are his employees, but it does not prevent his employees through the agency of any union to which they may belong to adopt any method prescribed by the union for the selection of a committee of employees to represent the union men in his employ. The employees, in this case, who belong to the union, and they are 90 per cent of all the employees, tendered a contract to the president of the company to induce him to change the shop from an open shop to a closed shop. He declined to accept this contract, and was within his right under the rules of the board in doing so. He is not, by the rules of the board, required to deal by contract with the union as a union, and in that sense he is not required to recognize the union.

"But the words 'recognition of the union' have had an artificial and an improper meaning given to them by employers. They have been too technical in their treatment of committees of their employees who have come to them to represent their union employees, when they have said to such a committee, 'Do you represent the union?' and 'If you do, we decline to deal with you.' The question is not whether they represent the union. The question is whether they, being employees, represent other employees, and if that is the fact, their mere refusal to say that they do not represent the union, or their admission that they do, does not imply a contract dealing with the union or any organization in the sense in which the War Labor Board understands the term.

"We think that due to the pride of the men in their union and organization, and the technical sensitiveness of the employer, many troubles have arisen that might have been completely avoided by a clear understanding of the view of the National War Labor Board in this regard."

Removing the Shackles from Foreign Trade

Chairman Hurley Cables from Paris Directing Shipping Board to Meet All Competition and It Is Quickly Done—Important Reductions in Freight Rates

WASHINGTON, Jan. 28.—Reports received here indicate that the difficulties which have been hampering our export trade are gradually disappearing. The War Department has released a large total of shipping tonnage, so that the United States Shipping Board has been able to turn back to the original owners practically all of the 1,200,000 tons of ships which it had been operating under requisition. Where it has not been possible to deliver the vessel itself to the owner the shipping board has arranged to permit the use of a Government vessel of equal tonnage. In all the requisitioned vessels thus freed for ordinary business is 245.

Shipping rates on commercial cargoes from the United States to all ports of the United Kingdom were cut 66 2/3 per cent yesterday. The new rates, which affect all commodities except cotton, were set by the British Ministry of Shipping.

The United States Shipping Board met the new schedules so promptly that there may be no possible prejudice against American bottoms and a uniform rate may be assured on all cargoes leaving this country for British ports. It had been decided some time ago to take this step just as soon as the inevitable cut in the British rates was decided upon. When the announcement was made, the director of operations at Washington at once took the necessary formal steps and then sent out notice of the board's action. This action was in harmony with a cablegram from Chairman Hurley from Paris directing that all competition be met by the board.

A Basic Schedule

All cargoes not yet loaded, even though they be already on the docks, will have the benefit of the new rates, which serve as a basic schedule, providing for a reduction from $3.50 to $1 per 100 lb. of general merchandise, and from $1.75 to 50c per cu. ft. This compares with a high record rate for the war period of approximately $6.50 per 100 lb. and a pre-war rate of about 20c. A new rate of $20 a ton has been fixed on steel for export to the United Kingdom, against a previous rate of $60 a ton and a pre-war rate of approximately $3 a ton. Business is already being accepted on the new basis.

The rate to Havre, Bordeaux, Antwerp and Rotterdam is $1.25 per 100 lb., or 65c per cu. ft., against the old charge of $66 a ton.

To Marseilles, Cette, Genoa and Naples the new rate is $1.60 per 100 lb., or 85c per cu. ft., against the old rate of from $71.50 to $75 per ton. Rates based on weight or measurement are at ship's option.

At the same time the board announced new rates from Atlantic and Gulf ports to ports in India as follows: To Colombo and Calcutta, $1.10 per 100 lb., or 60c per cu. ft., as against the old rate of $45 a ton, and to Rangoon and Madras, $1.20 per 100 lb., or 65c per cu. ft., against the former charge of $50 a ton.

The lowering of rates is of greatest importance because exporters are finding that the present is the strategic time to put the entering wedge into foreign markets. For instance, a special representative of the Chinese railways is now in the United States with a letter from Paul S. Reinsch, our minister to China, urging that everything be done to secure Chinese orders. At present the demand covers only 200 railroad cars and 25 locomotives, but these roads are in need of rehabilitation, and if this stock is purchased in the United States it would mean the beginning of the replacement of British building equipment with American rolling stock.

Both the Pan-American Union and the International High Commission in Washington are doing all in their power to expedite the extension of South American commerce. The chief difficulties lie in the shipping situation and in the realm of finance. At present there are requests from a long series of Central and South American governments for government loans which they have not been able to place in Europe. Some of these would be immediately used for purchases in the United States. For that reason it is possible that American bankers directly interested in American industries will yet be found to take care of them.

It is pointed out here that one of the incentives to speed export programs at this time is the fact that markets everywhere are showing a tendency to decline. For that reason American manufacturers would much prefer to sell abroad at present prices than to wait until the shipping channels of the world are free and the competition tends to cut the prices below the present levels. They cannot do this, of course, without a guarantee that shipping will be available. Both the shipping board, however, and private companies are trying to meet this situation.

Another feature that is making the export situation uncertain is the continuance of the blockade against the central powers. Government officials in Washington interested in the export situation have been favoring a release of that blockade—not for the benefit of the central powers—but to make possible a greater freedom of trade with the neutral countries of Europe. These nations are all under the restrictions imposed by the allied Governments to prevent their carrying on a free commerce with the central powers. The result has been to place a serious check upon other industries and so far has made it difficult for them to meet the new conditions. The decision on this blockade, however, will be reached in Paris and not in Washington.

The War Trade Board is continuing its abandonment of both import and export restrictions. Almost all supervision over the distribution of essential imported raw materials has been removed. This includes the abolition of restrictions on the imports of iron and steel, ferroalloys, plumbago and graphite and pyrites. For the present the restrictions are being retained on pig tin as well as tin ore and concentrates. This exception is necessitated by an international agreement made at the time that the allied governments pooled their purchases of these commodities.

The War Trade Board has also announced that licenses will hereafter be granted for the exportation of coal to Europe and to Argentine and Uruguay. Shipments for the countries contiguous to Germany, however, will be limited to the amounts prescribed in the several rationing arrangements for those countries.

Iron and Steel in France

American exporters have a vital interest in the announcement of the French Ministry of Industrial Reconstruction that the control of the Iron and Steel Consortium over imports was withdrawn Jan. 2, 1919, and stocks on hand are being liquidated. The consortium will continue to exist solely for the liquidation of stocks of iron and steel now held in various parts of France. Hereafter applications for license to import iron and steel should be addressed direct to the Ministry of Industrial Reconstruction, Raw Materials Section, Bureau of Importations. Refusal or approval of applications for licenses will be given within a period of three days. It is understood, says a cablegram from the office of the American commercial attache in Paris, that American firms and their affiliations will be given the same consideration in the matter of granting licenses as is given French firms.

The agricultural machinery needed by France, according to the estimate of George Ford, head of the Red Cross reconstruction work in Paris, includes 81,000 plows, 56,000 cultivators, 30,000 mowing machines, 115,-

000 farm wagons, 88,000 harrows, 50,000 rollers, 48,000 hoes, 36,000 seed drills, 13,000 fertilizers, 16,000 beet extractors, 21,000 winnowing machines, 18,000 horse-drawn rakes, 32,000 reapers and binders, and 53,000 root cutters.

The Greek Bureau of industry at Athens estimates the agricultural equipment needs of Greece for 1919 at 10,000 plows, 200,000 plowshares, 500 harrows, 200 reapers, 25 threshers, 100 presses, 500 sulphur spreaders and 500 copper sulphate sprayers for grapevines.

The British government has also been relaxing its export restrictions. According to an announcement cabled by Ambassador Davis from London the following articles may now be freely exported to any American country:

Cobalt, chrome and similar alloys, jeweled drawplates for drawing wire, ferrosilicon, ferrotitanium, hammers not otherwise specifically prohibited, manganese and manganese ore, nickel and its ores and alloys, platinum and its alloys and manufactures, revolution indicators suitable for aircraft, coal, selenium, silicon, spiegeleisen, thorium and its alloys, titanium and its alloys and ores, tungsten alloys and ores including ferberite, hubnerite, sheelig, and wolframite, tungsten except tungsten filaments for electric lamps, barbed and galvanized wire, and various chemicals.

American exports have been soaring. The December shipments were particularly heavy, bringing the total exports for 1918 to $6,150,000,000, according to the statistics compiled by the Bureau of Foreign and Domestic Commerce. This is a decrease of only $83,000,000 from the 1917 total. Imports for the year totaled $3,031,000,000, or not quite half the exports. Imports for the previous year were valued at $2,952,000,000.

Exports for December, the first full month after the signing of the armistice, reached a total of $566,000,000, a decided increase over the $522,000,000 recorded for November, although not up to the high mark of $600,000,000 for December, 1917.

Imports for December, however, were low, being $211,000,000, against $251,000,000 for November and $228,000,000 for December of the previous year.

Coke Producers Will Curtail Output and Make Repairs

Uniontown, Pa., Jan. 25.—Although production of coke in the Connellsville region reached its highest point for the week ended Jan. 17 since the war ended, there is every indication that the output will be curtailed for the next few weeks, and the figures for the current week will show a material decrease.

In deciding upon that policy for the first few weeks following the removal of price restrictions, coke operators are merely following the example of the furnaces, many of which are now down for repairs. Coke plants in the Connellsville region have been operating steadily with only those repairs made which could not be postponed. At the present time, there are few plants which are not in need of repairs, and with much contract coal thrown upon the market by reason of the suspension of furnaces for repairs, operators have come to the conclusion that there could be no better time to prepare their plants for the spring rush which all believe will commence when the iron and steel industry gets started on reconstruction work.

To what extent the curtailment in production will be depends largely upon market conditions. The attitude of the region is to keep production equal with the demand and not to create a surplus which they believe will contribute to beating down the market following the removal of Government prices. Producers claim with the present labor scale they cannot profitably sell coke for less than $6, and many operators without destination for a day's run of coke will lay off for a day rather than stack a surplus.

Although a number of furnaces are down for repairs, the market is absorbing all the Connellsville coke manufactured. Last week a considerable quantity of coke was put on the market, and some spot coke was sold for $5.75. Brokers are now getting some business for the first time in many months from operators whose entire output previously was under contract.

GAGE LABORATORIES OPENED

Sections Established Will Furnish Data and Make Tests for Manufacturers

The gage section of the Bureau of Standards has become known to a large number of American manufacturers who required limit gages in the production of interchangeable parts for munitions of war. There has been developed at the bureau an adequate organization, and the apparatus, equipment and methods in use are such as to permit accurate and quick testing of various types of gages; including screw-thread, plug and ring gages, profile gages and plain gages, as well as precision standards, measuring tools and apparatus.

Branch Sections Established

In addition to the gage section at Washington, branch sections have been established in the Engineering Societies Building, 29 West Thirty-ninth Street, New York, in the Plymouth Building, Twenty-second and Prospect avenues, Cleveland, and in the Meigs Building, Bridgeport, Conn. While the branch laboratory in Bridgeport was discontinued on Jan. 1, it is planned to continue the other laboratories as long as the need for these facilities remains.

With the organization now available at Washington and at the branch sections, it will be possible to handle the routine test and certification of quite a number of gages of all types. The future possibilities of this work depend entirely, however, upon the co-operation secured from manufacturers.

Technical Staff Retained

In connection with the work of the technical staff there has been accumulated a vast amount of information and data on the construction, measurement and use of all kinds of gages, and it is planned to use the technical staff now available for the preparation of pamphlets, publications and other literature in order to make this information accessible to American manufacturers. Furthermore, the technical staff will be engaged in research work; on steel treatment and methods used in the manufacture of gages; in developing, perfecting, designing and constructing simple forms of measuring instruments for shop use; and in arranging formulas, charts and methods of computation in simplified form for the use of tool makers and gage makers.

It is also thought that records of the experience and commercial practices gained by American manufacturers in the production of war material should be collected and co-ordinated for distribution, as this information would be of inestimable value to manufacturers in general. The Bureau of Standards could keep several men in the field to visit manufacturing plants and study gaging conditions throughout the country. The branch gage sections could be used as headquarters for the demonstration of apparatus and methods used by the Bureau of Standards, and of such commercial apparatus and methods of general utility as might appear of special value for the measurement or production of gages. Suggestions as to lines of research that would be profitable to them could also be sent by manufacturers directly to the technical staff of the Gage Section in Washington. For the work of the technical staff where the results are of general utility to American manufacturers, no charge will be made for the service rendered.

Schedule of Fees for Gage Tests

A nominal fee will be charged for the routine test of gages when the results of the test will be of benefit to but one or two parties. The amount of this fee will depend largely on whether the gage is one that is easily measured, or is a complicated gage requiring the expenditure of considerable effort in its test. The fee will be based upon the accuracy of the test desired.

Such gages, instruments or tools as may be submitted for test should be accompanied with drawings or specifications with which they are supposed to conform in order to facilitate the test and to permit the reporting of the important dimensions of the gage submitted. Also, complete information should be included as to the route of the shipment of gages, the nature of

the type desired, and the disposal of the gages after test. The following schedule of fees is proposed:

Plain ring gages, plain ring gages, snap gages, flat or round end standards or checks.....	50 cents each
Measurement of any one element, such as lead, angle or diameter, of threaded plug gages..	50 cents each
Measurement of lead or angle of threaded ring gages.....	50 cents each
Complete measurements of thread gages.....	$1.00 each
Photographs of form of thread of threaded plug or threaded ring gages.....	25 cents each
Profile gages or fixtures, depending upon the complexity.....	$1.00 up

Gage Shop Available

The gage shop was organized at the Bureau of Standards in Washington for the salvage of master gages and for the manufacture of master and inspection gages which were needed by the War Department for exigency purposes; such as to prevent stoppage of production, or for immediate use overseas. This shop, while not large, is equipped to manufacture all types of precision gages including precision end standards, profile gages, plug, snap and ring gages, and threaded plug and ring gages. It is planned that this shop be used for the manufacture of such standard gages as may be required for certain apparatus, such as complete sets of standards for the use of the Government and American manufacturers like those designated by the National Screw Thread Commission. These standards will be deposited in Washington, and possibly extra sets will be available at the branch laboratories for use in connection with problems or disputes arising among manufacturers. It is proposed, also, that this shop be utilized for the building of gages for manufacturers when the need is very urgent, and when they cannot be secured from commercial sources. This shop offers, furthermore, an opportunity for the development and construction of experimental models in the form of shop apparatus, and for the carrying out of mechanical details arising in gage research and investigation.

Manufacturers Should Act Promptly

Manufacturers are urged to utilize the facilities of the Gage Section to the fullest extent in connection with their manufacturing work. In order that suitable arrangements can be made to handle promptly the routine work of gage testing, manufacturers are requested to notify the Bureau of Standards now as to their desire to submit gages for test and to utilize the other facilities available, and, also notify the Bureau as to the approximate number of gages that may be submitted during the year.

New Electric Export Company

The General Electric Co. has announced the incorporation of the International General Electric Co. to develop the parent company's foreign interests and increase its export trade. The new company has a capital of $20,000,000, of which $10,000,000 is 7 per cent cumulative preferred stock and $10,000,000 common stock. All of the stock has been paid in and no public offering is contemplated. The directors in addition to Gerard Swope, president, include Gordon Abbott, A. W. Burchard, C. A. Coffin, George P. Gardner, J. R. Lovejoy, S. Z. Mitchell, G. F. Morrison, Charles Neave, E. W. Rice, Jr., and O. D. Young.

Catalogs Wanted

WASHINGTON, Jan. 28.—The Bureau of Foreign and Domestic Commerce has received the following cablegram from the American Consul at Brussels, Belgium:

"Please send immediately for Central Committee of Belgian Industries co-operating with Government, catalogs and trade journals for electrical machinery, belting, tanned leather, machine tools, all kinds of articles for reconstruction, automobiles, motors, hardware, woolen and cotton cloth, haberdashery, shoes, coal, tar, dyes, paints etc.; should be sent to American consulates in Belgium."

The U. S. Automatic Co., Amherst, Ohio, recently gave its employees and invited guests a banquet in celebration of the completion of a new addition to its plant. President William H. Schibley acted as toastmaster.

NEVILLE ISLAND PLANT

General Belief That Original Plan Will Not Be Carried Out—Work Stopped

While no official announcement has come from official circles at Washington as to the final disposition to be made of the proposed gun and projectile plant at Neville Island, Pittsburgh, which was to have been built by the Ordnance Department, U. S. Steel Corporation, it is the general belief that no further work will be done at Neville Island in the direction of building the gun and projectile plant. All active work has stopped, and it is expected that later on the Government may erect at Neville Island an ordnance depot for the storage of munitions, also of other materials such as lathes, planers and iron working tools in general, that will be distributed through various navy yards. All the contracts made by the Ordnance Department in connection with the construction and operation of the proposed ordnance plant have been canceled and the Government officials are now giving their time to settlement of claims involved in this work. In the short time that work was actively pushed at Neville Island, some barracks, mess houses and other buildings were erected, and what disposition will be made of these, has not yet been decided.

The United States Steel Corporation made a contract with the Government to build this plant and organized the Ordnance Department, which was to do the work. Many officials who came from steel plants of the Carnegie Steel Co. to the newly created Ordnance Department have been released, and have returned to their former positions. John S. Oursler, superintendent of the New Castle and Sharon, Pa., works of the Carnegie Steel Co., who was appointed general superintendent of the Ordnance Department, is still filling that position, and will likely remain for some time. A very large amount of detail work remains to be done in the settlement of claims, and also in negotiations that were under way for the purchase of property from farmers and others on Neville Island. Condemnation proceedings were started to secure a good deal of property on Neville Island, owned by farmers, and it will take some time to work out a settlement of these cases. It is understood that all contracts for machine tools were canceled, but before this was done, there had been made delivery of some very heavy lathes, which the Government will likely put in storage, either on Neville Island or some other place.

A General Engineering Society Proposed

The union of the various engineering societies of the country into a general engineering society is proposed by the Duluth Engineers' Club, Duluth, Minn., to supplement the work of the separate organizations and to devote its efforts to promote: (1) Status of the engineer; (2) general welfare; (3) professional ethics; (4) employment agencies; (5) relation of the engineer to the general public; (6) publicity; (7) social benefit. Technical work and the advancement of the arts and sciences would be accomplished in each individual society as at present. A committee composed of O. H. Dickerson, member American Society Civil Engineers; W. S. Heald, member American Institute Electrical Engineers; C. A. Graves, American Chemical Society; F. H. Linley, of the mechanical engineers; and D. E. Woodbridge of the mining engineers, is bringing the question before the engineers of the country, pointing to the timeliness of the movement in view of the fact that the co-operative arrangement among various societies, which have been in force, were only for the winning of the war, and now will be dissolved.

The Sligo Iron & Steel Co., Connellsville, Pa., maker of iron and steel bars, states it will make additions to its plants to increase its output to 5000 tons monthly.

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Declining Prices

The Federal Reserve Board in its annual review, made public last week, notes that prices in the western countries at the close of the war were approximately double those ruling at the beginning of the war, and observes that prices must come down; but since no material decline has thus far occurred, the board concludes that the decline will probably be gradual. While prices will not drop to their former level, they will decline "to something approximating it." The board's chief interest in prices is in connection with monetary conditions. The higher commodity prices are, the more money and credit are required. As prices decline, less will be required.

The theory that has been entertained in some quarters for months past, that prices could not come down much after the war, is not sufficiently supported by the arguments that have been put forth in its favor. The two principal arguments have been: first, that wages are up and cannot be reduced materially; and second, that there will be a demand for commodities sufficient to support the market.

As to wage rates and commodity rates having the ability to support each other, that is a case of "the blind leading the blind." Neither has an element of stability. Throughout the war we had "the vicious circle," of the one advancing because the other had advanced. Neither had a stabilizing influence upon the other. There is another factor, however, that in the long run always has a very great influence, and that is the wealth of the country, expressed in the real and personal property of the people. At pre-war valuation, this stands at $200,000,000,000 or $250,000,000,000.

Now it is true, roughly speaking, that the purchasing power of the dollar has been cut in half, that being the case whether one wishes to buy commodities or to buy labor. It is absolutely untrue, however, that the value of the dollar has been cut in half. If so, the "wealth" of the country would be estimable at 400 to 500 billions. Everyone knows, from his contact with present appraisals of the value of real and personal property, that nothing of the sort is the case. That rise has not occurred. It is the purchasing power of the dollar rather than its value that has changed: It is easy to see which is the stable and which the fluctuating element, and therefore to pick out which one is going to move toward the other.

The horrible example of the industrial depression of 1873-8 is both a proof of the correctness of this view and a warning. By reason of a lack of a sufficient supply of gold and because of an inadequate banking and currency system, the actual value of a dollar greatly declined during and after the Civil War—the situation was called that of "gold being at a premium"—and paper values of real and personal property did greatly advance, contributing to the bad state of affairs for conditions such as existed then and exist now. In all probability this would not have happened then, if it had not been for the currency conditions. One of the results was that the panic of 1873 was what in popular parlance was called "a real estate panic." The present generation of men can hardly realize what such a panic would be like or conceive how such a state could occur, but from the viewpoint of the eighteen-seventies it was a very real thing, only too true and substantial.

To borrow a term from the physical laboratory, the value of the dollar is to be calibrated by reference to the wealth of the country, the real estate, improvements and personal property, which is a real standard. The value of the dollar is not greatly changed. Its purchasing power, on the other hand, being greatly reduced in terms of common commodities of life, is going to be restored very largely. This condition is subject to natural laws, and no men, bankers or manufacturers or workmen, can prevent their operation. Attempted interference, while apparently successful for a time, would only in the long run accentuate the inevitable readjustment.

For illustration, suppose the present wage rate in the United States were $5 a day, and there were an all-powerful labor union and prices and wages showed a declining tendency. The union, say, decrees that hours of labor be reduced one-third so as to provide employment for all. The cost of a full day's labor thereupon becomes $7.50. The cost of operating a railroad train, an office building, a farm or a factory is increased 50 per cent in so far as the cost of operation is a labor

cost, as, in the last analysis, nearly all cost is. The income of the railroad, the building, the factory or the farm is not increased at all, and its value is thereby reduced. The total wealth of the country would be reduced correspondingly, whereas to hold down the value of the dollar, the appraised value of the country's wealth would have to be increased.

Great industrial activity cannot exist unless there is expansion and development, the erection of new buildings and bridges, the establishment of additional transportation facilities, the opening of new mines. These things, when created, are wealth, but the new wealth could not compete with the old, which would be of preponderating volume, if created by the expenditure of dollars having but half their former purchasing power. The investor will not take hold until he has a fair show and by his abstentation from buying he will help in the readjustment. Viewed from all angles it is evident that prices that have been inflated must be deflated, commodity rates and, in due time, wage rates.

Consolidating Engineering Societies

Out of the expanding sentiment for greater unity in engineering association activities has come very definite action on the part of the American Society of Mechanical Engineers. The step taken is a cautious one and does not go very far, but it is one in the direction desired by increasing numbers of engineers and will undoubtedly prove of far-reaching influence.

The council of the society by unanimous vote recorded its willingness to enter into an arrangement with the Cleveland Engineering Society whereby joint membership of mechanical engineers only qualified according to the respective requirements of the societies may be effectively fostered between the two organizations. There would be a division of the dues between the two societies, a reduction of $5 being made in the total amount now paid by the active or associate member belonging to both bodies. This sum, though not large enough to be deemed a serious crippling of the receipts when first applied, would, it is confidently believed, be sufficiently attractive to bring into both societies many mechanical engineers who are members of but the one or perhaps neither of the two bodies. The plan further contemplates that members of the American Society of Mechanical Engineers may join the Cleveland Engineering Society without the payment of an entrance fee. On the other hand, those who are already members of the Cleveland society may join the American society—after application and election in the usual and well-known way—by payment of the difference between the entrance fees of the two organizations. Mechanical engineers, not members of either society, but applying for joint membership will pay an entrance or initiation fee of $25; $18 of this going to the American society and $7 to the Cleveland society. Briefly, the foregoing is the tentative proposition adopted in principle by the governing boards of both societies and each pledged to put it into experimental operation at the earliest practicable date.

For several reasons the plan could not well be given a more auspicious test. Hearty approval has been gained among engineers for the idea that they take an active part in public affairs, that all technically trained men should unitedly serve the respective communities where they reside, as well as take an earnest, helpful interest in national problems. Co-operating as engineers, no matter whether their specialties are mechanical or electrical or civil or mining or metallurgical, should, as it has often been urged, repay in public service whatever is possible of their educational obligations. In Cleveland the local engineering society is strong in numbers, something over 1200. It maintains all the facilities of a club, is open every weekday, has regular and frequent meetings for all branches of the engineering professions, keeps a critical eye upon all local transactions of consequence to engineers, and energetically works in team style with the Cleveland Chamber of Commerce and other leading civic forces.

One naturally assumes that such a plan may easily lead to other similar arrangements between national as well as local engineering societies. Certainly, the present expenses in fees and dues do prevent many a young engineer from receiving the benefits of membership in several societies, no matter how well he may be qualified in all other respects. There is the prospect that this Cleveland plan may do much toward the still further integration of engineering organization endeavors, with all that this means in the way of economy of effort and money, in the way of individual self improvement and finally in the way of securing a more prominent place in the eyes of the public, which will not bestow full respect until the profession has made the most of its opportunities.

Prospective German Iron Conditions

Considerable curiosity is felt as to what the peace conference will do in the matter of providing for the movement of coal, iron ore and pig iron across the Franco-German border. The restoration of what since 1871 has been "German Lorraine" has been paraded as insuring sweeping changes in the iron and steel industries of the two countries. There have been many references to the tonnage of iron and steel Germany "loses" and the tonnage that France "gains." It is not unusually assumed, however, that provision will be made whereby the Germans may buy French ore or pig iron. Advices from Paris indicate that those of the French who desired annexation of the Saar basin to provide coal for the additional iron ore involved in the restitution of Lorraine territory have receded from their position. The necessary interchange of material may, perhaps, be arranged without a great deal of difficulty, so that while the nationality of primary operations, such as the mining of iron ore and perhaps the manufacture of pig iron, may be greatly changed, the finishing of the material into the steel of actual employment may not be greatly altered.

The changes in this matter to be brought about by the war have been depicted in such strong colors that it is well to note that Germany did not have, prior to the war, any long established or really very vital position with respect to iron and

steel. A few figures cited from the statistical records will show how ephemeral Germany's rise had been. The maximum production of pig iron in Germany and Luxemburg prior to the war was in 1913, 19,291,920 metric tons. In no year prior to 1903 had Germany made one-half as much, and in no year prior to 1892 one-fourth as much. The peace settlement will of itself certainly not set Germany back by as much as one-half in the matter of iron and steel production, if the country has energy and enterprise to use facilities available, but even such a setting back would be only to the condition of 1903, and in many other respects Germany by her own acts is set back very much more than that.

Of course we in the United States have acquired the habit of thinking that development is impossible without rapid increase in tonnage of iron and steel production. We cling to the idea that our pig iron production must double, or thereabouts, every ten years, or else something is wrong, but after all that view rests merely upon the chance experience of the past. The idea is given a rude shock by observing this statistical fact, that in 1882 the United Kingdom made 8,586,680 tons of pig iron, and in no subsequent year until 1896 was that quantity again made. No one will pretend that the country did not greatly develop, industrially and commercially, during the 13 years intervening. Germany, then, will be able to do a great deal with 10,000,000 tons of pig iron a year, despite the 19,000,000 tons of 1913, but will probably have opportunity to make much more than 10,000,000 tons if there is desire and ability to do so.

War-Befogged Countries

Few American manufacturers and distributors are without disputed contracts which have resulted from wartime conditions. Many of the cases will have to pass through the State Department, because other governments are involved, and the courts of various foreign nations as well as our own have been and will be called upon to settle differences of this character, if they cannot be settled amicably between the parties. The lawyers assert they have never seen such a tangle of contracts, so many involved questions entering into business relations. An unfortunate circumstance is that no two cases are alike. Each has its own perplexities, which cannot be dissipated easily, and as a result the process of settlement may require going to the higher courts on questions of law. To be sure, some famous cases have already developed and have been passed upon by the jurists, best known among them being that of the gold on the Kronprincessin Cecilie; the British courts have established various precedents since the beginning of the war. But others must be created before these contract issues will clarify easily.

For one thing embargoes have caused many disputes. The docks on both the Atlantic and Pacific coasts have been piled with goods which could not be shipped, first because of the British embargo, and then because of the American. Thousands of tons of American materials and goods, including machinery, were on the high seas when the British embargo went into effect, and upon arrival at British ports their consignees were not permitted to take them. Nor could the consignors get them back, and so they have remained unused and in some instances deteriorating. Where payment had not been made before the articles were shipped, the question of payment under the contracts becomes a disputed one. Should the consignee be compelled to pay for goods delivered at this late date? The contention is that the British Government is the responsible party and should pay the bill.

Another series of cases consists of dealings between citizens of Germany and Austria on the one hand and Americans on the other just before the war. Goods contracted for by Americans and paid for by them on receipt of bill of lading were delivered by Austrian and German factories on the docks in their home ports, and were never shipped and finally were commandeered by their governments. It is contended that the money paid for these goods should be included in the indemnity of the war.

A great number of disputes have arisen out of contracts entered into previous to the war, but never fulfilled because it was impossible to do so. Yet, with some exceptions, these contracts were not canceled automatically, as it might be presumed they would be. To quote from an article by John M. Hall in the *Columbia Law Review:* "That war has made the performance of an executed contract impossible in fact is not generally regarded by English and American courts as an excuse for non-performance. The common law rule is applied here as in numerous cases where impossibility arises out of facts other than a state of war, that simple impossibility of performing a contract never excuses the promiser from his liability." There are some exceptions to this rule, but it appears that most cases must be decided upon their individual merits in determining whether they are or are not exceptions.

Another source of doubt is included in what may be termed fulfillment of contract obligations. For example, a contract was made by an American manufacturer to deliver certain goods to a British user. The embargo intervened before any attempt at delivery was made. The war ends and the user no longer wishes the goods. Shall the contract be fulfilled at this late day? Or can the user seek compensation because the manufacturer did not deliver the goods at the time agreed? Concerning this Mr. Hall says: "Where war has been declared and an embargo has been laid, it is generally said that a contract, the performance of which is prevented by such embargo, is not dissolved but merely suspended. This means nothing more than this: Where the performance of A is prevented by an embargo, non-performance of A is excused during the continuance of the embargo. But since the embargo is regarded as a temporary expedient, likely at any moment to be lifted, B, the other party to the contract, is usually not permitted to treat such performance by A as a breach of the essence of the contract, at least until a reasonable time has elapsed without the embargo being raised." In not a few cases the question of "reasonable time" will have to be determined.

It is interesting to know that though a contract

between subjects of belligerent nations after the outbreak of war is usually declared void, a contract upon which actual performance required by its terms has taken place prior to the outbreak of war and nothing remains but an obligation to pay money, resting upon one of the contracting parties, the authorities are uniform in declaring that the obligee's right to collect the debt is not cut off by the war, but merely suspended for the period of the war. Moreover, the statute of limitations is extended by the length of the period of hostilities. Therefore, Americans have the right to collect money owed them by Germans, and likewise Germans will have the right to collect money owed them by Americans.

All in all, it is not difficult to realize something of the tangles which must be unsnarled as a result of business done just previous to and during the continuance of hostilities.

STEEL CORPORATION EARNINGS

Steady Decline in Last Three Months—Extra Dividend on Common Reduced

The United States Steel Corporation's report for the fourth quarter of the year 1918 shows net earnings of $36,354,165 after an allowance of $50,000,000 for war taxes, compared with an allowance of $31,585,198 for taxes in the first quarter of 1918, $90,716,250 for the second quarter and $101,987,347 for the third quarter. The steady decline in earnings which characterized the third quarter continued in the last three months of the year, the earnings for December being only $10,834,882. The regular quarterly dividends of 1¾ per cent on the preferred stock and 1¼ per cent on the common were declared, but the extra dividend on the common was reduced to 1 per cent as compared with 2 per cent in the third quarter and 3 per cent for each of the six preceding quarters. The dividend declarations for 1918 on the common amounted to 14 per cent, as compared with 17 per cent in 1917.

The net earnings for the past four years by quarters have been as follows:

Quarters	1918	1917	1916	1915
First	$56,961,424	$113,121,018	$60,713,624	$12,457,809
Second	62,557,391	90,579,204	81,126,048	27,950,055
Third	42,961,589	68,243,784	85,817,067	38,710,644
Fourth	36,354,165	59,724,125	105,968,347	51,232,788

Without making an allowance for the war taxes, the earnings of the Steel Corporation for the past eight quarters have been as follows:

First quarter, 1917	$113,121,018
Second quarter	144,498,076
Third quarter	131,976,797
Fourth quarter	120,674,489
First quarter, 1918	88,546,622
Second quarter	153,273,641
Third quarter	144,948,936
Fourth quarter	86,354,165

The report for the fourth quarter, ended Dec. 31, 1918, is as follows:

Earnings

	Earnings Before Charging Interest on the Subsidiary Cos.' Bonds Outstanding	Less: Interest on the Subsidiary Cos.' Bonds Outstanding	Balance of Earnings†
October, 1918	$14,405,810	$745,878	$13,659,932
November, 1918	12,604,081	744,730	11,859,351
December, 1918	11,578,589	743,707	10,834,882
	$38,588,480	$2,234,315	

Total earnings after deducting all expenses incident to operations, comprising those for ordinary repairs and maintenance of plants, allowances for estimated proportion of extraordinary cost of facilities installed by reason of war requirements and conditions, also taxes (including an estimate of $50,000,000 on account of Federal income and war excess profits taxes*), and interest on bonds of the subsidiary companies $36,354,165

Less, charges and allowances for depreciation, applied as follows:

To depreciation and extraordinary replacement funds and sinking funds on bonds of subsidiary companies	$8,947,273	
To sinking funds on U. S. Steel Corporation bonds	1,969,699	
		10,916,972
Net income		$25,437,193
Deduct: Interest for the quarter on U. S. Steel Corporation bonds outstanding	$5,187,162	
Premium on bonds redeemed	153,816	
		5,340,978
Balance		$20,096,215
Add, Net balance of sundry charges and receipts, including adjustments of various accounts		642,767
Total		$20,738,982
Dividends on stocks of the United States Steel Corporation, viz.:		
Preferred, 1¾ per cent	$6,304,920	
Common, 1¼ per cent	6,353,782	
	$12,658,702	
Extra dividend:		
Common, 1 per cent	5,083,025	
		17,741,727
Surplus for the quarter		$2,997,255

*Aggregate allowance made for year for these taxes is subject to revision upon final calculation under the law imposing taxes on net income for 1918.

†These amounts may be changed somewhat upon completion of audit of accounts for the year. The corporation's fiscal year corresponds with the calendar year, and complete annual report comprising general balance sheet, financial statements, statistics, etc., will be submitted at the annual meeting in April, 1919, or earlier.

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Disposing of Government Cranes Discussed

Still Working on Program for Selling Materials — Manufacturers Meet in Cleveland — Organization of Director of Sales Announced

WASHINGTON, Jan. 28.—The War Department is still at work on its program for the sale of surplus materials. The inventories which are to form the basis for the entire operation have not been completed, although they are gradually being made up and probably will be ready some time early next month.

The chief progress of the week was made in getting the manufacturers of locomotive cranes to meet in Cleveland, but another meeting will be necessary to agree upon the program for the disposition of the cranes that are to be sold. The men at the conference included Lieut.-Col. A. LaMar, representing the office of the Director of Sales; Maj. W. W. Houston, representing the Director General of Military Railways; Sheldon Carey and William H. Waite, of the Browning Co., Cleveland; Alexander Brown and Melvin Pattison, of the Brown Hoisting Machinery Co., Cleveland; Benjamin Dixon, Industrial Works, Bay City, Mich.; H. G. Steinbrenner, Orton & Steinbrenner, Chicago; C. F. Michael, Ohio Locomotive Crane Co., Bucyrus, Ohio; F. W. Lovell, McMyler Interstate Co., Bedford, Ohio; R. P. Shimmer, Link Belt Co., Chicago.

Colonel LaMar laid before the conferees the agreement reached with the machine tool industry and published in last week's IRON AGE. He proposed that it be accepted by the crane industry, because the two problems were similar. The crane manufacturers, however, declared that they believed the Government should make particular efforts to induce the Railroad Administration, the Navy and other Governmental departments to absorb as many of the surplus cranes as possible before the Government attempts to induce the manufacturers to take any of them back. After a long discussion the crane manufacturers voted neither to approve nor to disapprove the Government proposal for the present.

"It was agreed," declared the War Department's statement of the meeting, "that each individual manufacturer would make a statement of the value of his cranes to other Governmental departments and to the railways. This statement is necessary because a con-

Cranes Listed By the War Department for Disposal

Number to Be Sold	Locomotive Cranes	Manufacturer	Price Paid
24	9-ton Type "29," 8-wheel, 40-ft. boom (9 equipped with French Draft rigging and 16 M.C.B.)	The Osgood Co.	$12,400.00
47	15-ton Type "B," 8-wheel, 48-ft. boom, M.B.C. standard appliances; 14 of above to be equipped with magnet and generator and single sheave block. Price these cranes	.....	18,250.00
10	15-ton 8-wheel, 45-ft. boom, M.C.B. standard appliances	Brown Hoist..	19,900.00
2	15-ton 8-wheel, 50-ft. boom, French draft rigging.	Bucyrus Co....	20,680.00
1	15-ton 8-wheel, 48-ft. boom, French draft rigging.	Link Belt	18,566.00
3	15-ton 8-wheel, 45-ft. boom, M.C.B. standard appliances	Brown Hoist..	17,075.00
5	15-ton 8-wheel, 50-ft. boom, French draft rigging.	Ohio	19,800.00
10	15-ton Type "E," 40-ft. boom, M.C.B. standard appliances, 7½ kw. generator sets	Orton & Stein.	15,566.00
34	15-ton Type "E," 40-ft. boom (12 to have M.C.B. standard appliances and 22 to have French draft rigging)	Industrial	21,453.00
2	20-ton Type "G," 8-wheel, 40-ft. boom, French draft rigging	Industrial	19,870.00
4	20-ton Type "G," 8-wheel, 50-ft. boom, French draft rigging	Industrial	22,402.00
3	15-ton No. 8, 8-wheel, 50-ft. boom, French draft rigging	Browning	21,730.00
1	20-ton No. 8, 8-wheel, 46-ft. boom, French draft rigging, magnet and generator	.....	19,415.00
1	20-ton No. 8, 8-wheel, 50-ft. boom, French draft rigging	.....	22,135.00
5	20-ton 8-wheel, 50-ft. boom, M.C.B. standard appliances	Joliet Bridge and Iron ...	18,985.00
2	20-ton 8-wheel, 50-ft. boom, French draft rigging.	Browning	21,000.00
			19,080.00 and 19,420.00

Number to Be Sold	Locomotive Cranes	Manufacturer	Price Paid
7	25-ton Type H, 8-wheel, 50-ft. boom, French draft rigging	Industrial	$24,718.00
8	25-ton Type "H," 8-wheel, 45-ft. boom, pile driver attachment (4 equipped with French draft rigging and 4 with M.C.B. standard appliances)	Industrial	28,012.00
3	30-ton Model "F," 8-wheel, 50-ft. boom M.C.B., standard appliances. Sister hocks	Ohio	25,700.00
2	35-ton Type "L," 8-wheel, 40-ft. boom, French draft rigging, wrecking tools with spare parts	Industrial ...	27,240.00
9	35-ton Type "L," 8-wheel, 45-ft. boom, magnets and generators, outriggers (2 equipped with French draft rigging and 7 with M.C.B. standard appliances)	Industrial	24,132.00
3	15-ton Type Model "C," M.C.B. standard, 15-ton capacity, 8-wheel, 45-ft. boom	Ohio Loco. Crane Co.	19,800.00
18	15-ton Wrecking cranes, type "P," M.C.B. coupler and trucks, pump and fire hose lighting equipment, 17 are without booms and can be equipped with long booms for erecting purposes, 3 equipped with curved boom	Industrial	22,665.00
	Raised Pier and Gantry Cranes		
9	15-ton 2.4 M (7 ft. 10½ in.) gage, hinge of boom 17 ft. above track. 48 ft. 3½ in. boom, self-propelling, double drum	Variety Iron..	20,300.00
15	10-ton 2.4 M (7 ft. 10½ in.) gage, hinge of boom 17 ft. above track, 48 ft. boom, self-propelling, double drums	Brown Hoist..	16,884.00
6	5-ton 2-boom, electric cargo unloaders, 65-ft. booms, span of gantry, 44 ft. c. to c. of rails, operated by 3-drum electric hoist..	Clyde Iron Works	30,100.00

siderable portion of the cranes which are surplus are not such as would be readily marketed in the United States under present conditions. It will show the estimated cost of modifications which would be required, etc., etc. A meeting of the crane manufacturers will be held in Cleveland on Jan. 30, at which time this statement will be co-ordinated and forwarded to Washington for information and action.

"It was suggested at this meeting that the crane manufacturers are anxious to co-operate with Government representatives in disposing of this property, and they will be glad to furnish any information which they can secure, or they will help in the disposal of the property to other departments, if desired."

The accompanying list details the cranes which the Government has scheduled as "surplus" and which are to be disposed of.

War Department Plans

The War Department has also been speeding up the sale of surplus materials reported by the Construction Division. The first allotment taken up by the Board of Sales Review covered the materials to be sold at Camp Grant, near Rockford, Ill. It included lumber, miscellaneous building materials, electrical equipment, hardware, heating material, plumbing material, millwork and miscellaneous items aggregating in cost $867,000. The lumber is to be sold through the producers under a general agreement which has been reached with them. The remainder, says an announcement of the War Department, is to be sold in one of the following ways:

(a) Cash at auction.

(b) To highest bidder on sealed proposal on due public notice and in such market as the public interests require.

(c) At the current market price, if there is an established market for such property and current market quotations accompany the report of the sale, or at current market price as determined by a Board of Appraisal.

It was also announced that this program would be followed generally by the Construction Division in disposing of surplus materials at other projects.

Director of Sales Organization

The organization of the office of the Director of Sales has been completed as follows:

Director of Sales, C. W. Hare.

Assistant Director of Sales, E. G. Morse.

Machine Tools—Lieut.-Col. A. LaMar, Chief of Division.—All metal and wood-working tools, railway equipment, steam shovels, locomotive cranes, gantry cranes, hand tools, forging equipment, iron and structural workers' power tools and machinery.

Building Material—Maj. W. M. Crunden, Division Sales Manager.—Lumber, millwork, fire protection, water supply, fabricated steel, roofing, wall board, paints, refrigeration, hardware, brick cement, heating, machine equipment, electric equipment.

Trucks and Motor Equipment—Col. Fred. Glover, Division Sales Manager.—Trucks, motors, motor cycles, side cars and all surplus and repair parts pertaining thereto, animal and hand-drawn vehicles.

Quartermaster Stores—L. H. Hartman, Division Sales Manager.—Food, clothing, furniture, all issue materials, cotton linters, leather goods, rubber goods, rope, silk, cloth, chain, linen, thermometers, clocks, etc.

Raw Materials—Capt. A. L. Mercer, Division Sales Manager.—Pig iron, lead, brass, copper, steel ingot, platinum, nitrates, pig tin, manganese chrome, ferro-alloys, mica, liquid chloride mercury, nickel, non-ferrous metals, acids, chemicals.

Ordnance Supplies—Artillery, guns, small arms, all manufactured munitions, powder, explosives.

Scrap Material—Capt. A. L. Mercer, Division Sales Manager.

Administrative Division—Maj. C. S. Shaw. Office administration files, etc.

Board of Sales Review—Barton P. Jenks, Recorder; E. C. Morse, Chairman; Colonel LaMar, Major Crunden, Colonel Glover, Mr. Hartman, Mr. Woods, Captain Mercer, Captain Schultz.

CONTRACT BILL LAGS

Congress Still Fails to Furnish Means of Relief to Many Manufacturers

WASHINGTON, Jan. 28.—The measure to validate informal war contracts and provide machinery for the adjustment of canceled contracts has not yet been passed. The fight has been taken to the floor of the Senate by the report of the Senate Committee on Military Affairs proposing a substitute for the Dent bill passed by the House.

A week of delay has brought the various conflicting interests but little nearer agreement. The War Department still insists on the adoption of the Dent bill with its provision to put plenary power in the hands of the War Department to make final adjustments.

The substitute bill reported by the Senate Committee on Military Affairs provides for an Appeals Commission to which either the contractor or the Department of Justice, for the Government, can take an appeal from the War Department's settlement.

It is this kind of appeal by the Department of Justice that has called out against the Senate bill the opposition of the War Service Executive Committee of American Industries. Chairman Joseph H. Defrees of this committee gave out a statement explaining its attitude and particularly insisting upon hastening congressional relief.

"Speed in payment of the industries which did war work is absolutely vital in order that the industries may have use of their capital and thus employ the labor of the country, and assisting in preventing the bread line," said Mr. Defrees. "Already the newspapers are carrying stories of unemployment and it is clear that situation will grow worse unless the industries which have been doing war work can receive payment from the Government so that they can go immediately back to peace production.

"The appeals clause opens the way not only to delay in payment on informal contracts, but on formal contracts as well, of which the War Department now has full jurisdiction and which are being settled.

"The right of one department of the Government to appeal from the decisions of another is an anomaly in the history of legislation. Such a provision, if it were incorporated in the legislation as finally passed, would prevent the expeditious relief essential. The Department of Justice would feel that the right cast upon it would be a duty and it would have to organize forces to enable it to become advised and pass judgment upon all the details in respect to each contract up for settlement that it might be able to ascertain which decisions of the War Department it should appeal. This could mean nothing other than intolerable and endless delay and disaster, because in few cases could it make such investigation in the 30 days allowed for appeal and it would feel constrained to appeal every case in order that sufficient time could be allowed for it to make its investigation.

"Contractors should be given the right of appeal, however, because there could arise cases in which a manufacturer who went ahead on war work without a formal contract could be done a very great injustice by some careless officer of the War Department. But to give the Department of Justice the right to appeal from the decisions of another government department is absurd when the Government already is protected.

"The committee which I represent, represents in turn, through the War Service Committees of the industries, substantially 90 per cent of the industries of the United States and it is convinced that this feature of the bill as set forth must be eliminated in order not to defeat the purpose of the legislation, which everyone agrees is necessary and which must be so phrased as to give relief at the earliest possible day."

Even more vigorous opposition appeared on the floor of the Senate from Senator Hitchcock of Nebraska, who insisted on taking all power of settlement out of the hands of the War Department and turning it over to a special presidential commission.

Iron and Steel Markets

EXPORT OUTLOOK BETTER

Sharp Reduction of Ocean Freight Rates May Prove Stimulating

American Tin Plate Sold to Japan—Bar Iron Prices Decline Further in West

Export inquiry is awakened by the sharp cuts given to ocean freight rates on both sides of the Atlantic. The disparity of British and American charges has not been materially reduced but the change is sufficient to cause concern abroad, particularly over the possibility of United States steel and iron being imported to the exclusion of the home product.

Some thousand-ton lots of finished steel for England are now in storage here awaiting favorable vessel rates, and stocks there made at high costs are not yet liquidated.

In open competition an American mill has sold tin plates to Japan. The British fixed price is $43 a ton higher than the Pittsburgh quotation, and a less freight differential is all that is necessary to throw the business to the United States on a price basis.

At present the chief competitor of the United States for the world's business, England's iron and steel industry, burdened with high fixed prices thrown upon it when the government discontinued its subsidy of increased labor and freight costs, is now threatened with strikes. Meanwhile in a few months 2,000,000 tons annual capacity of blast furnaces will be in operation in Lorraine.

The pig-iron production of the United Kingdom for 1918 was about 250,000 tons below the 9,420,254 tons of 1917 and the steel ingot production of 1918 about 200,000 tons less than the 9,804,079 tons produced in 1917. In 1913 the British pig-iron output was 10,260,315 tons. These figures show how much a handicap was the war shortage of labor.

How much American investments will necessarily be tied to export projects is indicated in a Chinese railroad proposition which must be financed before the large lists of material before the trade will become matters of actual negotiation.

With less than half the war tax allowance, the total earnings of the United States Steel Corporation for the last quarter of 1918, $36,354,165, were $6,607,000 less than the earnings of the third quarter, when the income and excess profits taxes reservation was $101,987,347. How much of the showing, due largely to increased wages and other mounting costs, was also the result of working off long-deferred contracts is conjectural.

The withdrawal by the American Iron and Steel Institute of its recommendation that the proposed uniform sales contract be adopted by the trade is understood to be due to the encountering of unexpected difficulties. The prospect for general agreement on a formal contract is not now favorable. Some companies may, however, individually adopt the contract proposed by the institute's committee on contract obligations.

Competition with steel bars has brought bar iron in the West to a parity at 2.70c., Pittsburgh, but bar iron makers in the East adhere to the 3.50c. price, contending that their costs are too much to permit of a reduction.

A further reduction of $2 per ton in cast-iron pipe has been made by Eastern shops, so that the total drop is $5, as in the West.

A reduction in the working day from ten to eight hours at an Eastern steel plant resulted in a strike of a small force of employees, who objected to the decrease in earnings, but the contention of the strikers was not supported by the other workers, and the strike was of short duration.

Fabricating shops in the Middle West have been left without work by the transfer of orders for ship steel to Eastern fabricators. The absence of building activity makes it probable that some of these shops will be shut down.

The coke trade is disturbed by offerings for resale at below present Government prices. Demand has been reduced by the blowing out of blast furnaces, and $5 coke is now to be had in the Pittsburgh district.

Pittsburgh

PITTSBURGH, Jan. 28—(*By Wire.*)

The demand for sheets and tin plate is heavier than expected. The local market on scrap and coke is badly demoralized, with prices declining very fast. In the last few days standard makes of furnace coke, loaded on track, have been freely offered as low as $4 per ton, while there seems to be no bottom to prices on scrap. Forced sales of heavy melting steel are said to have been made at a consuming point east of Pittsburgh at $16 per ton, and turnings have been sold, delivered at Brackenridge, as low as $9 per ton. There is practically nothing being done in pig iron or semi-finished steel, and it is very doubtful whether reductions of $3 to $4 per ton below present prices would result in any material increase in new business. Consumers are not in the humor for buying and prices are cutting very little figure in the market. Any new sales of pig iron, semi-finished steel or finished steel products are for only small lots to meet actual needs, no consumers being willing to buy ahead at present prices. In a market like this there are always reports going of offers of material at prices very much below what are regarded as representing the general market, and the present situation shows no exception to this rule. It is said that Bessemer and basic pig iron are being offered for re-sale at below the $30 price for basic and the $32.20 price for Bessemer at Valley furnace. Reports are also current of offerings of billets several dollars below the market. The opinion is pretty general in the trade that it is a mistake to offer material at prices below the market, as this does not result in sales, but only adds to the hesitation of consumers in placing orders. There is a disposition on the part of makers of pig iron, also the steel mills, among coke makers, and in fact in all lines of steel products, to simply let the situation take care of itself, in the belief that by April the market will have settled down to a basis of prices that will be attractive to consumers and cause them to place their orders. In the meantime, business will probably be quiet.

Information has reached here that an organization has been formed at Washington to dispose of all kinds

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Jan. 28, 1919	Jan. 21, 1919	Jan. 1, 1919	Jan. 30, 1918
No. 2 X, Philadelphia	$36.15	$36.15	$36.15	$34.25
No. 2, Valley furnace	31.00	31.00	31.00	33.00
No. 2, Southern, Cin'ti†	34.60	34.60	34.60	35.90
No. 2, Birmingham, Ala.†	31.00	31.00	31.00	33.00
No. 2, furnace, Chicago*	31.00	31.00	31.00	33.00
Basic, del'd, eastern Pa.	33.90	33.90	33.90	33.75
Basic, Valley furnace	30.00	30.00	30.00	33.00
Bessemer, Pittsburgh	33.60	33.60	33.60	37.25
Malleable, Chicago*	31.50	31.50	31.50	33.50
Malleable, Valley	31.50	31.50	31.50	33.50
Gray forge, Pittsburgh	31.40	31.40	31.40	32.75
L. S. charcoal, Chicago	38.85	38.85	38.85	37.50

†Silicon, 1.75 to 2.25.

Rails, Billets, etc., Per Gross Ton:				
Bess. rails, heavy, at mill	$55.00	$55.00	$55.00	$55.00
O.-h. rails, heavy, at mill	57.00	57.00	57.00	57.00
Bess. billets, Pittsburgh	43.50	43.50	43.50	47.50
O.-h. billets, Pittsburgh	43.50	43.50	43.50	47.50
O.-h. sheet bars, P'gh	47.00	47.00	47.00	51.00
Forging billets, base, P'gh.	56.00	56.00	56.00	60.00
O.-h. billets, Phila.	47.30	47.30	47.30	50.50
Wire rods, Pittsburgh	57.00	57.00	57.00	57.00

Finished Iron and Steel, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Common iron bars, Phila.	3.145	3.145	3.145	3.685
Common iron bars, P'gh.	3.50	3.50	3.50	3.50
Common iron bars, Ch'go.	2.97	3.17	3.17	3.50
Steel bars, Pittsburgh	2.70	2.70	2.70	2.90
Steel bars, New York	2.97	2.97	2.97	3.095
Tank plates, Pittsburgh	3.00	3.00	3.00	3.25
Tank plates, New York	3.27	3.27	3.27	3.445
Beams, etc., Pittsburgh	2.80	2.80	2.80	3.00
Beams, etc., New York	3.07	3.07	3.07	3.195
Skelp, grooved steel, P'gh.	2.70	2.70	2.70	2.90
Skelp, sheared steel, P'gh.	3.00	3.00	3.00	3.25
Steel hoops, Pittsburgh	3.30	3.30	3.30	3.50

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Sheets, Nails and Wire,	Jan. 28, 1919	Jan. 21, 1919	Jan. 1, 1919	Jan. 30, 1918
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh.	4.70	4.70	4.70	5.00
Sheets, galv., No. 28, P'gh.	6.05	6.05	6.05	6.25
Wire nails, Pittsburgh	3.50	3.50	3.50	3.50
Cut nails, Pittsburgh	5.00	5.00	5.00	4.00
Fence wire, base, P'gh.	3.25	3.25	3.25	3.25
Barbed wire, galv., P'gh.	4.35	4.35	4.35	4.35

Old Material, Per Gross Ton:				
Carwheels, Chicago	$23.00	$26.00	$26.00	$30.00
Carwheels, Philadelphia	23.00	25.00	25.00	30.00
Heavy steel scrap, P'gh.	16.00	17.00	22.00	30.00
Heavy steel scrap, Phila.	16.00	16.00	18.00	30.00
Heavy steel scrap, Ch'go.	15.50	16.50	19.00	30.00
No. 1 cast, Pittsburgh	21.00	23.00	27.00	30.00
No. 1 cast, Philadelphia	23.00	24.00	24.00	30.00
No. 1 cast, Ch'go (net ton)	20.50	21.00	25.00	26.00
No. 1 RR. wrot, Phila.	23.00	24.00	25.00	35.00
No. 1 RR. wrot, Ch'go (net)	15.75	16.00	21.50	31.25

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$5.00	$5.25	$6.00	$6.00
Furnace coke, future	6.00	6.00	6.00	6.00
Foundry coke, prompt	5.00	5.25	7.00	7.00
Foundry coke, future	7.00	7.00	7.00	7.00

Metals,	Jan. 28, 1919	Jan. 21, 1919	Jan. 1, 1919	Jan. 30, 1918
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	20.00	20.00	23.00	23.50
Electrolytic copper, N. Y.	20.00	20.00	23.00	23.50
Spelter, St. Louis	6.75	6.75	7.65	7.62½
Spelter, New York	7.10	7.10	8.00	7.87½
Lead, St. Louis	5.00	5.25	5.70	6.85
Lead, New York	5.30	5.50	6.00	7.00
Tin, New York	71.50	71.50	71.50	85.00
Antimony, Asiatic, N. Y.	7.50	7.50	7.62½	14.00
Tin plate, 100-lb. box, P'gh	$7.35	$7.35	$7.35	$7.75

of materials on hand by the Government, and the Chamber of Commerce of the United States has sent out a circular listing such materials, giving quantity and other information. The statement is made that it is believed these materials can be sold to consumers without seriously disturbing the general market. The matter has been put in the hands of an official, to be known as Director of Sales, and one item included in the list sent out is that for about 160,000 kegs of wire nails.

There is a surplus now of labor, and in many cases men are offering to work at wages much below what they were formerly paid before the war closed. This is especially true in the coke regions, where there have been large suspensions of operations, throwing many men out of work. Aside from coke and scrap, prices on all other steel products are fairly strong, but with persistent reports of offerings of material at below what are regarded as present prices.

Pig Iron.—There is no inquiry in the market for Bessemer and basic iron, but reports are that both grades are being offered for resale at lower than what are regarded as regular prices. However, we do not hear of any sales of iron being made, even at the lower prices reported. Some small lots of foundry iron are being sold for prompt shipment at the regular price of $31, Valley, for No. 2, but no consumers are buying ahead. Many blast furnaces have gone out of blast, especially merchant stacks, since the first of the year, and others are getting ready to blow out. Some of the steel works furnaces are also down, mostly for relining and repairs, but here and there high cost furnaces belonging to steel companies are being blown out, as the owners do not want to pile iron at present high costs. The Republic Iron & Steel Co. has four or five furnaces idle, and one of the Hubbard furnaces of the Youngstown Sheet & Tube Co. is also idle. The Carnegie Steel Co. intends to blow out more furnaces, as soon as some of those now idle have been started, and the present quiet condition in the pig iron trade will be taken advantage of to reline and repair furnaces that would have been out months ago except for the abnormal demand for iron. The lower prices ruling for coke will soon be an important factor in determining prices for pig iron. No sales of iron have been made in this market recently, and we repeat former prices as follows:

Basic pig iron, $30; Bessemer, $32.20; gray forge, $30; No. 2 foundry, $31; No. 3 foundry, $30.50, and malleable $31.50, all per gross ton at Valley furnace, the freight rate for delivery in the Cleveland and Pittsburgh districts being $1.40 per ton.

Ferroalloys.—The market is practically bare of inquiries, consumers of alloys of all kinds having heavy stocks and in some cases alloys are being offered for resale at relatively low prices. It is said that $200 for 70 per cent ferromanganese could be shaded on a firm offer. Several large lots of 50 per cent ferrosilicon are being offered for resale.

We quote 70 per cent ferromanganese at $190 to $200, delivered, and 16 to 18 per cent spiegeleisen, $60, f.o.b. furnace, an addition or deduction of $3.50 per unit being made, when the manganese content is above or below the standard. Fifty per cent ferrosilicon is quoted at $125.

We quote 9 per cent Bessemer ferrosilicon at $52; 10 per cent, $54; 11 per cent, $57.30; 12 per cent, $60.60. We quote 6 per cent silvery iron, $39; 7 per cent, $40; 8 per cent, $42.50; 9 per cent, $44.50; 10 per cent, $47. Three dollars per gross ton advance for each 1 per cent silicon for 11 per cent and over. All the above prices are f.o.b. maker's furnace, Jackson or New Straitsville, Ohio, these furnaces having a uniform freight rate of $2.90 per gross ton, for delivery in the Pittsburgh district.

Billets and Sheet Bars.—Mills rolling billets and sheet bars and also dealers report there is no inquiry and say that even if present prices on billets and sheet bars were reduced $3 or $4 per ton, it is doubtful whether any new business would result. Reports are that soft Bessemer or open-hearth billets have been offered at $41, Pittsburgh, which is $2.50 below the regular price. The sheet and tin plate mills are operating better and the consumption of steel by these consumers is heavier. The Government is reported to have on hand, mostly in mill yards, large quantities of steel

and just how this will be disposed of, without seriously unsettling the market, is a question.

We quote 4 x 4 in. soft Bessemer and open-hearth billets at $43.50, sheet bars $47, slabs $46, and forging billets $56 base, all f.o.b. at mill, Pittsburgh or Youngstown.

Structural Material.—Inquiry is very light, and most of the larger steel fabricating plants are down to about a 50 per cent basis of operation, with very little work ahead. Local fabricators have bid on 8000 tons of steel for a city viaduct at Chicago, but no new local work is coming up.

We quote beams and channels up to 15 in. at 2.80c. at mill, Pittsburgh.

Iron and Steel Bars.—The demand for iron and steel bars is quiet, new orders placed being only for small lots for quick shipment and to cover actual needs of consumers. Specifications against contracts for steel bars are coming in only at a fair rate, and from the implement trade are not very satisfactory. The demand for reinforcing steel bars is also very quiet, owing to the dull condition in building operations all over the country.

We quote soft steel bars rolled from billets at 2.70c.; from old steel rails, 2.80c.; common iron bars, 3.50c.; bar iron rolled from selected scrap, 4.25c.; and refined iron bars at 5c. at mill, Pittsburgh.

Sheets.—This week the American Sheet & Tin Plate Co. is operating its sheet mills to better than 80 per cent of capacity, and reports from the independent mills are that they are operating to 70 or 75 per cent. Work ahead on the books of the sheet mills will take their output, based on present operations, for possibly a month or six weeks, but beyond that period the mills have very few orders. There are reports going of shading in prices on sheets, but the mills claim they are not doing this and if it being done, it is by jobbers who desire to move out more promptly their stocks of sheets. The supply of sheet bars is ample for all needs, and some mills have accumulated heavy stocks. Prices on sheets are given in detail on page 333.

Tin Plate.—Mills report receipts of specifications against contracts for tin plate at a much heavier rate than expected, and this week the American Sheet & Tin Plate Co. is operating its hot tin mills to about full capacity, but how long this will last is uncertain. Some leading can companies have recently sent in fairly heavy specifications for tin plate on old contracts, but very few new contracts for first half of this year have been made. There is a good deal of export demand and it is stated a moderate amount of export business is being placed, some for China and Japan. We quote tin plate for domestic use at $7.35 per base box f.o.b. Pittsburgh. Prices on terne plate are given in detail on page 333.

Wire Rods.—None of the mills rolling wire rods is operating to the full capacity owing to dull demand, one leading maker operating last week to only about 35 per cent, while others are running from 50 to 60 per cent. Quotations are made right along on foreign inquiry, but very few actual sales result. As a rule, prices quoted on foreign business are higher than domestic, and this probably largely explains why so few export sales are being made. There have been some small sales of soft Bessemer and open-hearth rods recently at the reported full price of $57 at mill. Prices on different grades of rods are given on page 333.

Wire Products.—A statement just sent out by the Chamber of Commerce of the United States at Washington purporting to give a complete list of building materials on hand by the Government shows it has on hand at present 159,622 kegs of wire nails. This is a much smaller quantity than was generally supposed the Government had on hand, which recently had been put at as high as 800,000 kegs. The fact that the actual quantity is only about one-fifth of this amount will relieve the anxiety of the mill operators to a large extent, as they feared the stocks were much heavier. Just how the Government will dispose of these nails is not known now, but the statement above referred to says that it is the intention of the Government to dispose of its stocks of building materials in such a way that it will not seriously disturb the general market. The demand for wire and wire nails is light, jobbers and consumers placing orders only for small lots to meet actual needs. One leading wire nail mill here was operating last week to only 35 to 40 per cent of capacity, but this is below the general average of operations, which is probably 50 per cent or more. Reports are current of shading in prices on both wire nails and wire, but the mills deny this and say they are holding prices firm on the small amount of new business being placed. There is some export inquiry for wire nails on which higher prices are usually quoted than to the domestic trade. Prices on wire products are given in detail on page 333.

Hot-Rolled Strip Steel.—Mills report the demand as limited, and only for small lots to meet actual needs, but say that specifications on contracts placed last year, and on which deliveries were delayed owing to the war demand, are coming in at a fair rate.

We quote hot-rolled strip steel, as made by hoop and band mills, at 3.30c. per lb., while for deep stamping or drawing quality steel, 50c. per 100 lb. extra is charged, all f.o.b. Pittsburgh.

Cold-Rolled Strip Steel.—Most of the demand is coming from the automobile trade, which has increased its purchases very much recently. Jobbers and general consumers are buying only in small lots to cover current needs.

We quote cold-rolled strip steel at $6.25 base per 100 lb. f.o.b. Pittsburgh, for 1½-in. and wider, 0.100 in. and thicker hard tempered in coils under 0.20 carbon. Boxing charge 25c per 100 lb.

Shafting and Screw Stock.—Makers report the demand from the automobile trade is increasing very materially, and promises to be heavier. From the implement and screw stock trade the demand is light. None of the makers of shafting and screw stock is running to more than 50 per cent of capacity, but it is claimed regular discounts are being held.

We quote cold-rolled shafting at 20 per cent off list in carloads and 16 per cent in less than carloads, f.o.b. Pittsburgh.

Nuts and Bolts.—The demand is showing some increase, but is not heavy enough to allow the makers of nuts and bolts to operate to full capacity. It is said that stocks of nuts and bolt held by the Government are heavy, and a good deal of interest is being shown by the trade as to how the Government will dispose of these reported heavy stocks. Jobbers are not buying very largely, but only in such quantities as are needed to round out stocks. Makers claim discounts are being held, and these are given in detail on page 333.

Rivets.—Reports from other places of serious shading in prices of rivets are not confirmed here. Local makers state that to shade prices would not result in any great increase in new orders, but would only add to the uncertainty that now exists with jobbers and consumers as well. Makers of rivets have a fair amount of orders on hand over the next month or six weeks, but there has been a general slowing down in operations.

We quote button head structural rivets at $4.40 and conhead boiler rivets at $4.50 base, f.o.b. Pittsburgh.

Spikes.—Some inquiries are in the market from railroads for small quantities of spikes for prompt delivery, but the impression is general that the Railroad Administration at Washington has notified purchasing agents of railroads not to make contracts for spikes without first getting authority from Washington to do so, and this has not been given. The Grand Trunk has not yet closed on its recent inquiry for 4000 kegs. The demand for boat spikes is active, and if the shipbuilding program is gone through with will likely be for a long time to come.

We quote standard spikes 9/16 x 4½ in. at $3.65 and small spikes at the same price in carload lots of 200 kegs or more at $3.65 per 100 lb., plus usual extras. We quote boat spikes at $5.00 base per 100 lb. plus usual extras in carload lots of 200 kegs or more, all f.o.b. Pittsburgh.

Hoops and Bands.—The demand is light for both hoops and bands, and specifications against contracts are not very active.

We quote steel hoops and bands at 3.30c. base, with the usual extras.

Skelp.—The demand is reported by makers to be very quiet and contracts have been pretty well cleaned up. It is said prices are being held.

We quote grooved skelp at $2.65, universal skelp, $2.80 base. Special skelp for boiler tubes, etc., is $3.15 for base

sizes and $3.30 for other sizes, all these prices being per 100 lb., Coke, Pittsburgh.

Coke.—The coke trade seems to be in a state of complete demoralization, due to recent heavy increase in output and also to the fact that a very large number of blast furnaces are idle for relining and repairs, and have shut off shipments. One leading coke concern that has been supplying furnace coke to nearly a dozen different blast furnaces reports that shipments have been shut off from every one of them, due to the furnaces either going out of blast or too heavy stocks of coke piled at the furnaces. In the last few days what is known as second-grade of furnace coke has been offered freely at $4 per ton at oven and standard makes at $5 per ton. It is claimed there will be no trouble in buying standard grades of furnace coke at considerably below $5, but there is no demand for it. One leading steel company has been offering some surplus blast furnace coke in this market recently. The dull demand for coke and the heavy stocks at the ovens have resulted in a good many shut-downs at plants, particularly the smaller works, that cannot possibly make furnace coke at much below $6 per ton and get out even. It is said that coke loaded on cars has been standing for more than a week and makers are unable to find destination for it. The output of coke in the upper and lower Connellsville regions for the week ending Jan. 18 was 291,332 tons, an increase over the previous week of over 20,000 tons. It is likely, however, that output from this time on will show a decrease, owing to the shut-down of so many works. We quote furnace coke and also 72-hr. bee-hive foundry coke at about $5 per net ton at oven, but no doubt this price could be materially shaded on a firm offer.

Boiler Tubes.—The new demand is dull, from both the locomotive and boiler shops, as work has quieted down very decidedly. Makers claim that discounts on both iron and steel tubes are being firmly held. These discounts are given on page 333.

Plates.—The shipbuilding interests are the heaviest consumers of plates at present, the demand from the steel car companies and the boiler shops being very quiet. Some plate mills report they have work ahead for about a month, but very little beyond that period. Mills are looking to the export demand to take a good part of their output of plates in the near future. It is said the Railroad Administration will come in the market before long, with large orders for cars and track materials, but nothing definite about this has been given out. Some of the plate mills are already short of work, and are slowing down materially in operations.

We quote sheared plates at 3c., Pittsburgh mill.

Wrought Pipe.—The local pipe trade was somewhat disturbed last week by reports coming from a supply house that on Feb. 1 prices on tubular goods were to be reduced five points, or $10 per ton, by one of the leading interests. Careful inquiry discloses that there is no basis whatever for this report, and it is believed to be absolutely untrue. The new demand for lap-weld sizes of pipe is very active and promises to continue so over the remainder of this year. Very large inquiries are in the market for line pipe for gas and oil lines and the development of the Ranger field will no doubt bring orders for many thousands of tons of line pipe to Pittsburgh mills in the next few months. The mills making tubular goods are operating at 80 to 90 per cent of capacity, and have work ahead on this basis for several months. The demand for butt-weld pipe is quiet, owing to dull building conditions all over the country. Discounts in effect on iron and steel pipe are given on page 333, but prices are being shaded to some extent by some jobbers who desire to move out stocks of pipe more rapidly.

Old Material.—Conditions in the local scrap market seem to be getting steadily worse, and prices are still rapidly declining. Selected heavy stamping steel scrap was sold to a consuming point east of Pittsburgh at $16 per gross ton delivered and blast furnace turnings at about $10 delivered. A large consumer of turnings at West Brackenridge, Pa., bought lately about 1000 tons at $9 delivered, the lowest price on this grade of scrap reached in several years. Mills report their stocks of scrap as very heavy.

Heavy steel melting, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh, delivered	$16.00 to $17.00
No. 1 cast, for steel plants (nominal)	21.00 to 22.00
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Franklin, Pa., and Pittsburgh	22.00 to 23.00
Compressed steel	14.00 to 15.00
Bundled sheet, sides and ends, f.o.b. consumers' mills, Pittsburgh district	13.00 to 14.00
Bundled sheet stampings	13.00 to 14.00
Railroad grate bars	14.00 to 15.00
Low phosphorus melting stock	20.00 to 21.00
No 1 busheling	16.00 to 17.00
Iron car axles	37.00 to 38.00
Locomotive axles, steel	36.00 to 37.00
Steel car axles	38.00 to 39.00
Railroad malleable	18.00 to 19.00
Machine shop turnings	9.00 to 10.00
Cast iron wheels	22.00 to 23.00
Rolled steel wheels	18.00 to 19.00
Sheet bar crop ends (at origin)	25.00 to 26.00
Heavy steel axle turnings	12.00 to 12.50
Heavy breakable cast	22.00 to 23.00
Cast iron borings	12.00 to 13.00
No. 1 railroad wrought	25.00 to 26.00

Chicago

CHICAGO, Jan. 27—(*By Wire*).

The leading interest is running full in all save its electric steel department, and the principal independent is operating at about 70 per cent. With all producers, however, it is a case of eating into their backlog. Despite the lower freight rate of $30, exports via the Pacific continue unsatisfactory, inasmuch as bottoms are lacking.

Despite the fair rate of activity of local mills, a considerable number of men have been laid off, one mill letting about 25 per cent of its force go for the time being. There has been a suggestion that the men work but eight hours, and they are willing to do this, but they want no reduction in pay, and as this is not the time for an advance in wages, it does not look well for the 8-hr. day. Several public and railroad undertakings, such as the suspended union depot in Chicago, bridges and viaducts, are looked to for relief in the present emergency, but it will be some time before the tonnage comes to the mills. Lake and Pacific shipyards have all the plates and shapes they need to fill the contracts they have in hand, and more ships must be placed before they will be in the market again. The makers of bar iron are meeting the 2.70c. Pittsburgh price of mild steel bars.

Pig Iron.—New business is confined to an occasional carload sold for prompt delivery, some of the sales involving resale iron. There is not nearly as much resale iron on the market as was expected to appear. Melters in general are taking deliveries, in most cases not because they need iron, but because they agreed to take it in consideration of the application of the $3 reduction to contracts. Several of the large southern merchant producers have not yet declared themselves in the matter of accepting the reduction and the Jackson County makers of silvery and Bessemer ferrosilicon have decided to take no action for the present.

The following quotations are for iron delivered at consumer's yards, except those for Northern foundry, malleable and steel-making irons, including low phosphorus, which are f.o.b. furnace, and do not include a switching charge averaging 50c. per ton:

Lake Superior charcoal, Nos. 2 to 5	$38.70 to $39.00
Lake Superior charcoal, C to AA	40.70 to 42.50
Lake Superior charcoal, No. 6	41.20 to 41.50
Northern coke foundry, No. 1 silicon, 2.25 to 2.75	32.25
Northern coke foundry, No. 2 silicon, 1.75 to 2.25	31.00
Northern high phosphorus foundry	31.00
Southern coke, No. 1 foundry and No. 1 soft silicon, 2.75 to 3.25	39.00
Southern coke, No. 2 foundry, silicon, 2.25 to 2.75	37.25
Southern foundry, silicon, 1.75 to 2.25	36.00
Malleable, not over 2.25 silicon	31.50
Standard Bessemer	32.20
Basic	30.00
Low phosphorus (copper free)	52.50
Silvery, 7 per cent	47.00

Ferroalloys.—There is no business to test prices, but that all ferroalloys are weak and that substantially lower prices than have prevailed would be accepted is agreed on all sides. Resale spiegeleisen has appeared and $60 furnace can be done. Ferromanganese is dormant at the nominal price of $225 delivered, and it is conceded that $200 would be accepted, and possibly less. In 50 per cent ferrosilicon $125 has been done in an Ohio transaction, and from that figure to $130 is the market.

We quote 70 per cent ferromanganese nominal at $200 to $225 delivered; 50 per cent ferrosilicon at $125 to $130, delivered, and 16 to 18 per cent spiegeleisen at $65 furnace.

Plates.—The situation is quieting down. Domestic consumers are less active and the shipyards have all the plates they need for the contracts they have in hand. Until more ships are ordered, they will not buy more plates. Meanwhile the mills have enough unfilled orders to keep them busy for several weeks. The export situation is but little changed.

The mill quotation is 3c., Pittsburgh, the freight to Chicago being 27c. per 100 lb. Jobbers quote 4.27c. for plates out of stock.

Bars.—Though 2.90c. was announced as the quotation for common bar iron, a lower price is being made to meet the competition of mild steel, which is quoted at 2.70c. Pittsburgh. In fact, bar iron has been sold on the latter basis. Iron is quiet. Mild steel bars are in rather light demand, but there is a growing call for concrete reinforcing bars.

Mill prices are: Mild steel bars, 2.70c., Pittsburgh, taking a freight rate of 27c. per 100 lb.; common bar iron, 2.97c., Chicago; refined iron bars, 3.65 to 4.40c.; rail carbon, 2.80c., Pittsburgh.

Sheets.—The demand for sheets is better than that for most other products. The calls come from many directions, and the aggregate with the leading independent is sufficient to keep all its mills operating.

Chicago delivery out of stock regardless of quantity, No. 10 blue annealed, 5.17c.; No. 28 black, 6.22c., and No. 28 galvanized, 7.57c.

Mill quotations are 4.70c. for No. 28 black, 3.95c. for No. 10 blue annealed, and 6.05c. for No. 28 galvanized.

Wire Products.—The consumption appears to be good, but current orders are mostly of the hand-to-mouth variety and individually they are not large.

Cast-Iron Pipe.—Detroit has not yet placed the 2000 tons it requires. Toledo, Ohio, will take new bids Feb. 4 on 1000 tons. The makers are encouraged by the fact that a number of propositions appear to be taking concrete form, and they hope the reduction of $5 per ton will stimulate business.

We quote per net ton, f.o.b. Chicago, ex-war tax, as follows: Water pipe, 4-in., $64.80; 6-in. and larger, $61.80; class A and gas pipe, $1 extra.

Bolts and Nuts.—What was said of wire products applies to bolt and nut orders. Quotations are without change.

Structural rivets, 5.67c.; boiler rivets, 5.77c.; machine bolts up to ⅞ x 4 in., 40 per cent off; larger sizes, 25 and 5 off; carriage bolts up to ⅞ x 6 in., 35 off; larger sizes, 20 and 5 off; box pressed nuts, square topped, 75c. off; hexagon tapped, 55c. off; coach or lag screws, gimlet points, square heads, 40 per cent off. Quantity extras for nuts are canceled.

Rails and Track Supplies.—Railroad purchases for maintenance of way continue largely confined to track fastenings, but even for these there are no exceptional orders. The leading interest has sufficient rail orders to keep its mills busy for eight or nine months.

Standard railroad spikes, 3.65c., Pittsburgh. Track bolts with square nuts, 4.90c., Pittsburgh. Tie plates, steel, 3c., Pittsburgh and Chicago; tie plates, iron, 3.30c., f.o.b. maker's mills. The base for light rails is 3c., f.o.b. maker's mill, with usual extras.

Structural Material.—Much hope for future business is being placed in the efforts to get under way public and railroad works requiring shapes, but it will be some time before these projects make themselves felt at the mills. In Chicago a union depot, several bridges and a viaduct are in prospect and the preliminary steps, particularly as to financing, are progressing favorably. The shipyards have all the shapes they need. The American Bridge Co. will fabricate a girder span for the Joplin division of the Missouri Pacific Railroad, taking 105 tons, this being the only job reported.

The mill quotation is 2.80c., Pittsburgh, which takes a freight rate of 27c. per 100 lb. for Chicago delivery. Jobbers quote 4.07c. for material out of warehouse.

Old Material.—The market is shot to pieces. There is practically but one mill buying and it is taking bargains to the extent of its ability. Unquestionably there is more scrap than can be absorbed under present conditions and apprehension is felt as to what will happen when the Government releases the large quantities it is known to have in its possession. Low as many of the offers are, consumers are refusing to accept some of them. Railroad offerings have contracted, but a good-sized list containing 1000 tons of rerollers comes from St. Paul. Old contracts are about cleaned up, either through delivery or cancellation.

We quote for delivery in buyers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Iron rails	$23.00 to $24.00
Relaying rails	50.00 to 55.00
Carwheels	23.00 to 24.00
Steel rails, rerolling	17.00 to 18.00
Steel rails, less than 5 ft.	17.00 to 18.00
Heavy melting steel	15.50 to 16.50
Frogs, switches and guards, cut apart	15.50 to 16.50
Shoveling steel	15.50 to 16.50
Per Net Ton	
Iron angles and splice bars	$24.00 to $25.00
Steel angle bars	16.00 to 17.00
Iron arch bars and transoms	25.50 to 26.50
Iron car axles	31.00 to 32.00
Steel car axles	27.00 to 28.00
No. 1 railroad wrought	15.75 to 16.25
No. 2 railroad wrought	14.75 to 15.25
Cut forge	14.75 to 15.25
Pipes and flues	13.00 to 14.00
No. 1 busheling	14.50 to 15.00
No. 2 busheling	9.00 to 9.50
Steel knuckles and couplers	19.00 to 19.50
Coil springs	19.00 to 19.50
No. 1 cast	20.50 to 21.00
Boiler punchings	20.00 to 21.00
Locomotive tires, smooth	25.00 to 26.00
Machine-shop turnings	7.00 to 8.00
Cast borings	10.50 to 11.50
Stove plate and light cast	16.00 to 17.00
Grate bars	14.50 to 15.00
Brake shoes	14.50 to 15.00
Railroad malleable	15.00 to 15.50
Agricultural malleable	14.00 to 15.00
Country mixed	11.50 to 12.50

Philadelphia

PHILADELPHIA, Jan. 28.

Though trying to view the future with optimism, steel men here are not encouraged by present conditions, and those in the selling departments foresee a continuation of light steel demand for the next few months, at least. The view entertained in some quarters that there is no serious unemployment situation and that the steel industry is not expecting a depression is not generally shared, for the facts are that there is already an unemployment problem, and dull times in the steel industry are here. Some believe that there will not be any notable improvement in demand before the last half of the year, while others fix the date for resumption of general buying activity much nearer at hand.

It is certain that most of the independent steel producers are face to face with a serious situation. At a western Pennsylvania plant last week, 1000 men were laid off. The largest Eastern producer of steel is on single turns in practically all departments and more than one-third of its blast furnaces are out of blast. Another large independent company has orders sufficient for only 60 days. A Philadelphia steel company has changed from two 10-hr. turns a day to two 8-hr. turns, and is working only five days a week. A large steel fabricating plant has gone on a four-day week on account of curtailment of shipbuilding work and the absence of any demand for structural steel for building purposes.

There are few favorable aspects. The export demand is expected to improve with lower shipping rates, but exporters say that prices for steel products are still too high, and that a really substantial export business will not be done until there are reductions of from $10 to $20 a ton from present prices. Some of the smaller steel producers declare that such reductions are impossible until labor costs come down.

Two and One Half Acres of Shell Forgings at the Plant at St. Louis of the Wagner Electric Mfg. Co., All to Be Scrapped

So far there has been little labor disturbance among Eastern steel plants. At one plant there was a strike of about 20 boys because of a reduction of turns from 10 hr. to 8 hr., with corresponding reduction in pay, but the strike did not receive the sanction or support of the older workmen and it was of short duration. It is declared that many of the steel plant workers are beginning to realize that war-time rates cannot continue long under present conditions, and steel company executives expect little difficulty in putting wage reductions into effect when such action becomes vitally necessary.

Pig iron prices are being fairly well maintained so far as the furnaces are concerned, though resale lots are being offered to brokers at $2 a ton below current quotations. It is admitted by iron sellers that if desirable business should be offered, furnaces would shade prices, but they see no object in doing so on the small orders which are now being placed.

Scrap continues to weaken. There have been sales of heavy melting steel at $16 delivered and of blast furnace borings and turnings at $10.

Pig Iron.—It is freely admitted by pig iron sellers that prices will eventually go lower, but they see nothing to be gained by making reductions on such small business as is now being transacted. One of the steel companies which has basic iron to sell might make a substantial concession from present prices on a 20,000 or 30,000 ton inquiry, but is not tempted by the very small tonnages which are now being sought. The same situation holds true in a measure on foundry iron. At present, eastern Pennsylvania furnaces are quoting too high to compete with Buffalo furnaces in New England, but as little business is being offered from that district, competing quotations have not yet appeared. Likewise, Virginia producers, when inquiry improves sufficiently, will undoubtedly quote lower prices for shipment to the Philadelphia district, but in the absence of buying interest now, they are adhering to the $34 base price for No. 2 plain iron. A Richmond, Va., consumer will probably buy in Birmingham because he can obtain Alabama iron delivered in Richmond at $35.10, as compared with a delivered price of $35.90 from Virginia furnaces. Virginia producers are said to be obdurate in the matter of contract revisions, several having positively refused to reduce contract prices $3 a ton. In asking for contract revisions, consumers have, in a few instances, insisted on changes which would have worked to their own disadvantage. For example, some who had made contracts prior to Oct. 1, 1918, at a flat price f. o. b. furnace have wanted a "reduction" to the present basis. As foundry iron was sold at $33, base, in third quarter, a change to the present basis would mean $34.90, Philadelphia, and if the freight rate from the furnace supplying them happens to be less than $1.90, they would, of course, lose by the change of price. However, sellers have declined to make such revisions as a matter of principle, even though it would give them a higher price at present for their iron. Several furnaces in this district will soon go out of blast. The Bethlehem Steel Co. is now on about 60 per cent pig iron production. We quote standard grades of iron delivered Philadelphia, except standard low phosphorus, which is quoted f. o. b. furnace:

Eastern Pennsylvania No. 2 X (2.25 to 2.75 sil.)	$36.15
Eastern Pennsylvania No. 2 plain (1.75 to 2.25 sil.)	34.90
Virginia No. 2 X (2.25 to 2.75 sil.)	39.35
Virginia No. 2 plain (1.75 to 2.25 sil.)	38.10
Basic	33.90
Gray forge	33.90
Standard low phosphorus, f.o.b. furnace	51.00
Copper-bearing low phosphorus	48.90

Ferroalloys.—There is no demand from consumers. Producers are quoting $225, delivered, for 70 per cent ferromanganese and about $60 to $65 for 16 to 18 per cent spiegeleisen. One seller's opinion is that when business is done in ferromanganese, it will be at about $175. Some small lots offered for resale have been disposed of at around $200.

Ore.—Receipts of manganese ore on old contracts are more than sufficient to take care of needs, probably in some cases exceeding actual requirements of ferromanganese producers, whose output of this alloy has

been greatly curtailed. We note the receipt last week of a cargo of 2,150 tons from Brazil valued at $43,741. From Spain there was received at this port last week 6,343 tons of low phosphorus iron ore, valued at $95,145.

Billets.—A local consumer inquired for 2000 tons of rerolling billets of special analysis last week. Among various quotations received was one of $41 for 1000 tons of Bessemer rerolling billets, f. o. b., Pittsburgh. The business has not yet been closed. We quote open-hearth rerolling billets at $47.30, delivered, Philadelphia.

Coke.—No sales of coke are reported in this market at concessions from the Government prices of $6 for blast furnace coke and $7 for foundry coke, which are in effect until Feb. 1, but sellers do not expect to do any further business on this basis. There is no demand of importance for spot coke.

Plates.—Several mills in this district are greatly in need of business and are curtailing production. A central Pennsylvania mill will be shut down during February for repairs. A few mills are still quoting 3.25c., Pittsburgh, and one mill in particular is doing some business in extra wide plates at this base price, with usual extras for width. We quote sheared plates, ¼ in. and heavier, at 3.245c., Philadelphia.

Old Material.—An eastern Pennsylvania consumer has bought a few small lots of heavy melting steel at $16, delivered. Nothing lower than this is reported, though the market is very weak. The same consumer is offering $9 for blast furnace borings and turnings. About 2000 tons of stove plate was sold last week to a central Pennsylvania steel plant at $22.50, delivered, but this price could not be duplicated, the market being quoted at $18 to $20. Machine shop turnings are worth $10 to $11 a ton, but there have been few transactions. Practically nothing is being done in low phosphorus melting steel, and one dealer believes not more than $20 to $22 could be obtained. The War Department has asked dealers to bid on various grades of Government scrap, but in the absence of any active demand from consumers they have been unable to say what scrap is worth to-day. The quotations here given are largely nominal, as on some grades there is not enough trading to establish definite values. We quote for delivery at consumers' works, eastern Pennsylvania, as follows:

No. 1 heavy melting steel	$16.00 to $18.00
Steel rails, rerolling	18.00 to 20.00
No. 1 low phosphorus, heavy, 0.04 and under	22.00 to 24.00
Iron rails	30.00 to 32.00
Carwheels	23.00 to 25.00
No. 1 railroad wrought	23.00 to 24.00
No. 1 yard wrought	20.00 to 21.00
Country yard wrought	12.00 to 15.00
No. 1 forge fire	15.00 to 16.00
Bundled skeleton	15.00 to 16.00
No. 1 busheling	18.00 to 19.00
No. 2 busheling	14.00 to 15.00
Turnings (for blast furnace use)	9.00 to 10.00
Machine-shop turnings (for rolling mill use)	10.00 to 11.00
Cast borings (for blast furnace use)	10.00 to 12.00
Cast borings (clean)	13.00 to 15.00
No. 1 cast	23.00 to 24.00
Grate bars	18.00 to 20.00
Stove plate	18.00 to 20.00
Railroad malleable	18.00 to 20.00
Wrought iron and soft steel pipes and tubes (new specifications)	18.00 to 20.00
Ungraded pipe	14.00 to 16.00

Shapes.—Several fabricating plants in the Philadelphia district are on the verge of shutting down because of lack of orders, contracts for ship work having been concentrated at some of the new shops which the Emergency Fleet Corporation built for that purpose. One Philadelphia fabricator will adopt a four-day week on account of decreased work. There are no signs yet of resumption of building activity of any importance. The British Government representatives refused offers of 2c. and 2.25c., Pittsburgh, for 1,000 tons of angles which are stored near Philadelphia. Their quotation was 2.80c., but it is predicted by brokers that they will be forced to sell for less. We quote plain material at 3.045c., Philadelphia.

Bars.—An improving demand for steel bars from jobbers is noted by the mills. These orders are mostly single carloads, but they make a fair aggregate as compared with orders being booked for other rolled products. Bar iron makers are still quoting 3.50c., Pittsburgh, but practically nothing is being done at this price. Makers doubt whether a sharp cut would bring out much business under present conditions. We quote soft steel bars at 2.945c., and common bar iron at 3.745c., Philadelphia.

Rails.—No large rail orders are in sight. A western Pennsylvania rail mill will shut down next week because of lack of business. Relaying rails for export to Cuba have been sold in small lots at $55 to $57, f. a. s. New York. Mills still quote $55 for Bessemer heavy rails and $57 for open-hearth at mill.

Wire Products.—A quickening demand for plain barbed wire from jobbers and country hardware trade is in evidence. Prices remain unchanged.

Buffalo

BUFFALO, N. Y., Jan. 27.

Pig Iron.—The market has shown a little more tendency towards dullness and inactivity than a week ago, so far as new business is concerned; inquiry and orders both being lighter, the largest tonnage reported being for 1,000 tons of foundry grades. A few producers report a light falling off in the volume of shipments on old contracts, but this class of shipments still represents the larger part of production. Coke costs are lower and furnaces are getting their supplies through from ovens promptly. The price schedule remains unchanged from last week as follows, f. o. b. furnace, Buffalo:

No. 1 foundry, 2.75 to 3.25 silicon	$34.00
No. 2 X, 2.25 to 2.75 silicon	32.25
No. 3 foundry, 1.75 to 2.25 silicon	31.00
Gray forge	30.00
Malleable silicon not over 2.25	31.50
Basic, 1 to 1½ per cent mang	30.50
Basic, 1½ to 2½ per cent mang	31.00
Bessemer	32.20
Lake Superior charcoal, regular grades, f.o.b. Buffalo	38.50

Finished Iron and Steel.—Most sellers report that the number of orders covering bars, shapes and wire products have increased during the week, although no orders for large quantities of any commodity have been placed. The aggregate tonnage, however, represents a marked improvement and is to cover immediate needs. Reports from a less number of sellers are not quite so favorable as to activity in inquiry, and one local producer of bars and plates has a number of open hearth furnaces down on account of lack of demand.

Old Material.—The scrap market continues to weaken, and there appears to be absolutely no buying in this district. None of the mills or foundries are making any effort to purchase and no interest whatever is being shown by consumers in any kind of scrap materials. Large quantities of shell forgings and billets which are not now usable for the purpose originally intended and which will eventually be placed on the market as scrap are held in the hands of the Government awaiting crystallization of the situation and determination of the matter of price at which they can be sold. A ban has been placed by some local consumers on compressed steel scrap, for the reason that serious furnace trouble has been traced directly to the inferior scrap compressed into the center of the material by some dealers. We quote the market, per gross ton, f. o. b. Buffalo, as follows, the prices of the schedule being largely nominal:

Heavy melting steel, regular grades	$14.00 to $15.00
Low phosphorus, 0.04 and under	19.00 to 20.00
No. 1 railroad wrought	18.00 to 19.00
No. 1 machinery cast	21.00 to 22.00
Iron axles	23.00 to 24.00
Steel axles	23.00 to 24.00
Carwheels	21.00 to 22.00
Railroad malleable	19.00 to 20.00
Machine shop turnings	7.50 to 8.00
Heavy axle turnings	13.00 to 14.00
Clean cast borings	11.00 to 12.00
Iron rails	21.00 to 22.00
Locomotive grate bars	16.00 to 17.00
Stove plate	16.00 to 17.00
Wrought pipe	13.00 to 14.00
No. 1 busheling	13.00 to 14.00
Bundled sheet stampings	11.00 to 12.00

Birmingham

BIRMINGHAM, ALA., Jan. 27.

Pig Iron.—The Southern pig iron situation is still mixed as to prices, the leading interest having been openly joined by at least another in quoting $31, while, with possibly one exception, all show a greater disposition to make concessions on both 1918 as well as new business. The business that is going has been in small lots. The leading interest is credited with having made a number of bookings and is now regularly in the market to sell such tonnage as it can from time to time spare from its own uses. The largest foundry producer at this time maintains the $34 level and gets that price on the small amount of prompt business that is being booked. This company is strongly situated, its order books for the first six months of the year nicely balancing with its producing capacity. Altogether there has been a considerable easing up of the heretofore stiff Southern attitude. The Tennessee company has renewed operations at one Bessemer and the Alice furnace recently banked on account of coke shortage. Other renewals by this company are in prospect. The Woodward Iron Co. is operating three stacks and the Sloss-Sheffield Steel & Iron Co. five; the Alabama Co. two, and the Republic Iron & Steel Co. two. We quote per gross ton f.o.b. Birmingham district furnaces as follows:

Foundry, 1.75 to 2.25 silicon	$31.00
Basic	30.00

Cast Iron Pipe.—Nothing can be said of pipe except that operations are at a low ebb on remnants of Government work and some little for municipalities with little or no new business offering. The one exception is in the sanitary pipe trade, where warehouses have begun study of the reduced rates and are corresponding with makers preparatory to a schedule of spring business.

Old Material.—The scrap market has sagged in several items to still lower levels, with consumers having practically their own way. A fair business is being transacted at the new prices. Low prices at other centers prevent much outside trade. We quote per gross ton f.o.b. Birmingham district yards, prices to consumers, as follows:

Old steel axles	$28.00 to $30.00
Old steel rails	15.00 to 16.00
Heavy melting steel	14.00 to 14.50
No. 1 railroad wrought	20.00 to 21.00
No. 1 cast	20.00 to 20.50
Carwheels	20.00 to 20.50
Tramcar wheels	19.50 to 20.00
Machine shop turnings	8.00 to 8.50
Cast iron borings	8.00 to 8.50
Stove plate	13.00 to 13.50

Cleveland

CLEVELAND, Jan. 28.

Iron Ore.—With the large stock piles in the furnace yards, a decreased consumption of ore and a buying movement apparently far away, shippers are planning for a late opening of the season of navigation, although present conditions indicate that vessels could go into commission very early next spring, should an early start be required. Dock shipments are light. So far ore prices for 1919 have been given very little consideration. We quote, delivered lower Lake ports, as follows:

Old range Bessemer, $6.65; old range non-Bessemer, $6.40; Mesaba Bessemer, $6.40; Mesaba non-Bessemer, $5.75.

Pig Iron.—There are very few inquiries for pig iron, and these are materializing into orders very slowly. One interest reports several inquiries for foundry grades in lots up to 1000 tons for the first half, and there is a tentative inquiry from an Indiana melter for 5000 tons, but the amount in the latter inquiry will probably be scaled down considerably. Other selling interests report an almost total absence of inquiries. There is no new demand whatever for steel making and malleable grades. A number of furnaces in this territory are piling considerable iron, but so far no merchant stacks have been blown out. No shading of the prices established Jan. 1 has taken place. However, the trade points to the fact that because of the light demand there has been no incentive to make lower quotations, and some feel that when an inquiry is made of sufficient size to test the market, it will bring out lower prices than the ruling quotations. This feeling that firmness is lacking in the market seems to be justified because of an apparent disposition of some in the trade to meet the situation of greater production than demand by naming lower prices to fill up order books. We quote, delivered Cleveland, as follows:

Bessemer	$33.60
Basic	30.40
Northern No. 2 foundry	31.40
Southern, No. 2 foundry, silicon, 2.25 to 2.75	37.25
Gray forge	30.40
Ohio silvery, 8 per cent silicon	46.90
Standard low phosphorus, Valley furnace	51.00

Coke.—There is considerable uncertainty as to prices that will prevail for coke after the Government regulation is removed Jan. 31. Some standard Connellsville furnace coke is being offered at $5.75. A small amount of Connellsville foundry coke is being sold in car lots at the present established price.

Finished Iron and Steel.—The demand for steel has improved somewhat during the past week, but consumers are continuing the policy of buying only small lots for early requirements. Orders are coming largely from the farm implement, tractor and automobile fields, and from manufacturers who cater to the oil industry. An Ohio tank shop has placed 1200 tons of plates for oil tank work and another inquiry is pending for 400 tons for oil tanks and makers of oil well supplies are buying steel freely. The tractor and agricultural implement makers have scheduled large outputs and are buying additional steel. There is a heavy demand for spring steel for automobiles and mills are crowded with orders for this steel. Other steel requirements for automobiles continue to bring out many orders for small lots of material. Manufacturers in many lines are complaining of a lack of orders, but prices on all lines appear to be firmly maintained. Demand for plates is not active, but 7000 tons on the books of a Cleveland mill for car work which was held up several weeks ago has been released. Local plate mills have enough orders to keep them busy several weeks. Shortage of vessel space and congestion at New York docks are interfering with the securing of export plate orders. The demand for semi-finished steel is light and a Cleveland mill has very little work on its books. Bar iron is quiet with local prices very irregular, being somewhere between the present Chicago and Pittsburgh prices. There is a good demand for hard steel bars, largely from the implement trade. Warehouse business is light. Warehouse prices are as follows:

Steel bars, 3.87c.; plates, 4.17c.; structural material, 3.97c.; No. 10 blue annealed sheets, 5.07c.; No. 28 black sheets, 6.12c.; No. 28 galvanized sheets, 7.47c.

Bolts, Nuts and Rivets.—Demand for bolts and nuts is light, and makers are rapidly catching up on orders. Some plants are now operating from 50 to 75 per cent of capacity. Buying is only for early requirements. No price concessions from regular discounts are reported. Rivet prices continue to show a weakening tendency. While manufacturers have reaffirmed present prices, one or more makers are making concessions of from $3 to $4 a ton. However, leading makers are inclined to hold to regular prices at least until they use up their high-priced raw material shipped before Jan. 1. Prices on small rivets on which the regular discount is 50 and 10 per cent, are being shaded quite freely 5 per cent and in some cases 10 per cent.

Old Material.—The market continues very weak, and prices on many grades have further declined. Yard dealers are taking advantage of the present low prices and are buying round lots of scrap, particularly borings, turnings and heavy melting steel, which they will hold for an expected advance. A Cleveland consumer has purchased about 3000 tons of high-grade heavy melting steel at $18. Sales to dealers of turnings at $8.50 to $9.50 per gross ton and borings at $11 to $12 are reported. One Youngstown district mill is offering $15 for a round tonnage of heavy steel, but the trade does not expect that this price will bring out any material. A Pittsburgh district mill is offering $7.50 per gross ton for turnings and $12.50 for borings delivered. There is very little demand from consumers in this territory. It is understood that 85 per cent of the Cana-

dian shell steel recently offered in this country has been absorbed, mostly by yard dealers. We quote, delivered consumers' yards in Cleveland and vicinity, as follows:

Steel rails	$19.00 to $20.00
Steel rails, under 3 ft.	24.00 to 25.00
Steel rails, rerolling	25.00 to 26.00
Iron rails	27.00 to 28.00
Iron car axles, nominal	37.00 to 38.00
Steel car axles, nominal	37.00 to 38.00
Low phosphorus belting	23.00 to 24.00
Heavy melting steel	17.00 to 18.00
Cast borings	11.00 to 12.00
Iron and steel turnings and drillings	8.50 to 9.00
Compressed steel	19.00 to 20.00
No. 1 railroad wrought	21.00 to 21.50
Cast iron car wheels	23.00 to 25.00
Agricultural malleable	18.00 to 19.00
Railroad malleable	19.00 to 20.00
Steel axle turnings	16.00 to 17.00
Light bundled sheet	11.00 to 11.50
No. 1 cast, nominal	22.00 to 23.00
No. 1 busheling	17.00 to 18.00
Railroad grate bars	15.00 to 16.00
Stove plate	15.00 to 16.00

St. Louis

ST. LOUIS, Jan. 27.

Pig Iron.—The local market is standing still, representatives of the furnaces reporting that consumers are still out of the market and indisposed to contract ahead for material for which they themselves are not yet contracted in finished goods. This attitude is due to impressions that there may be lower prices than the $3 cut made by a few furnaces, while still others of the consumers aver that they prefer to contract both ways on a more stable basis of prices even if there should result a rise in prices during the delay. Most consumers are in position to play a waiting game, for while their supplies on hand may not be large, they are either sufficient to meet definite needs or are protected by existing contracts for deliveries.

Old Material.—The scrap market continues in a moribund state, the dealers being unwilling to buy or sell except on immediate needs to fill existing contractural demands. There is no trading among the dealers, except as noted and the offerings from the railroads and other sources continue to go at very low prices or not at all, according to the selling agents' view of the bids. The entire scrap trade is, in effect, marking time and there is no reason for accepting the quotations made other than as estimates of value, as there is not enough business stirring to make a definite market. With this reservation we quote dealers' prices, f. o. b. customers' works, St. Louis district, as follows:

Per Gross Ton

Old iron rails	$27.00 to $27.50
Old steel rails, rerolling	21.50 to 22.00
Old steel rails, less than 3 ft.	18.50 to 19.00
Relaying rails, standard sections, subject to inspection	45.00 to 50.00
Old carwheels	22.00 to 22.50
No. 1 railroad heavy melting steel	18.00 to 18.50
Heavy shoveling steel	17.00 to 17.50
Ordinary shoveling steel	16.00 to 16.50
Frogs, switches and guards, cut apart	18.00 to 18.50
Ordinary bundled sheet scrap	11.00 to 11.50
Heavy axle and tire turnings	12.00 to 12.50

Per Net Ton

Iron angle bars	$22.00 to $23.00
Steel angle bars	16.00 to 16.50
Iron car axles	29.00 to 29.50
Steel car axles	25.50 to 26.00
Wrought arch bars and transoms	24.00 to 24.50
No. 1 railroad wrought	18.00 to 18.50
No. 2 railroad wrought	17.00 to 17.50
Railroad springs	15.00 to 15.50
Steel couplers and knuckles	15.00 to 15.50
Locomotive tires, 42 in. and over, smooth inside	14.50 to 15.00
No. 1 dealers' forge	12.50 to 13.00
Cast iron borings	10.00 to 10.50
No. 1 busheling	15.50 to 16.00
No. 1 boilers cut to sheets and rings	10.50 to 11.00
No. 1 cast	16.50 to 17.00
Stove plate and light cast	14.00 to 14.50
Railroad malleable	14.00 to 14.50
Agricultural malleable	13.00 to 13.50
Pipes and flues	12.50 to 13.00
Heavy railroad sheet and tank	11.00 to 11.50
Railroad grate bars	11.00 to 11.50
Machine shop turnings	10.00 to 10.50
Country mixed	11.50 to 12.00
Uncut railroad mixed	12.00 to 12.50
Horseshoes	16.00 to 16.50

Coke.—Coke continues quiet at the revised prices, with no demand of consequence for either metallurigael or domestic grades, while the local by-product supply continues to go forward under its existing contracts.

Finished Iron and Steel.—In finished products, while consumers and contractors are feeling out the market they have, as yet, failed to enter the market with any contracts of consequence, though the mills are in a receptive mood, but not actively seeking business. Movement out of warehouse is rather quiet and deliveries have practically caught up, so that nothing of the deferred condition prior to the cessation of hostilities exists. There has been no change in mill prices and figures for stock out of warehouse stand as follows: Soft steel bars, 4.04c.; iron bars, 4.04c.; structural material, 4.14c.; tank plates, 4.34c.; No. 8 sheets, 5.19c.; No. 10 blue annealed sheets, 5.24c.; No. 28 black sheets, cold rolled, one pass, 6.29c.; No. 28 galvanized sheets, black sheet gauge, 7.64c.

New York

NEW YORK, Jan. 28.

Pig Iron.—The announcement of the reduction in ocean freight rates to new foreign points has been received with much satisfaction among pig iron sellers, but not enough time has elapsed to determine definitely how much business will be developed. Inquiries for about 10,000 tons for export have appeared and some attention is being given to business which seemed to be in a moribund state but now gives some promise of developing into orders. Domestic business is extremely quiet. Buyers are in some cases more insistent on revision of contracts and are obtaining concessions. We quote prices as follows for tidewater delivery for Northern and Southern grades:

No. 1 foundry, silicon, 2.75 to 3.25	$37.90 to $38.30
No. 2 X, silicon, 2.25 to 2.75	36.15 to 36.55
No. 2 plain, silicon, 1.75 to 2.25	34.90 to 35.30
No. 2 X, Virginia, silicon, 2.25 to 2.75	36.40
No. 1 Southern, silicon, 2.75 to 3.25	41.70
No. 2 Southern (all rail), silicon, 2.25 to 2.75	39.95
No. 2 Southern (all rail), silicon, 1.25 to 2.25	38.70

Finished Material.—The Chinese Government is in the market for a large list of equipment and steel for railroad improvements, including locomotives, cars, bridges, rails and track fastenings and miscellaneous steel products. In some quarters it is reported that about $10,000,000 will be expended in this country if the purchases can be financed here. Some time may elapse before the negotiations reach a point where actual orders can be placed. Meanwhile, steel export companies are submitting quotations on specifications which run into many folios. Export demand, it is expected, will be greatly stimulated by the reductions in ocean freight rates, which were announced on Monday by the British Ministry of Shipping, followed by identical cuts made by the United States Shipping Board. Rates to the United Kingdom were reduced from about $66 per net ton to $20, while proportionate reductions to other European countries and to the Far East and South America were put into effect by the Shipping Board. The handicap under which American steel exporters have been working is illustrated by the fact that on an inquiry for 1000 tons of hoops for India the British c.i.f. quotation was about one-half of the American quotation. Although British prices on nearly all steel products are higher than American prices, the great difference in freight rates has made it possible for England to take considerable business which under equitable freight rates would undoubtedly have come to this country. It is pointed out by exporters that the new freight rates are still several times higher than the pre-war rates, and further reductions are expected when greater ship tonnage becomes available for commercial cargoes. Domestic inquiry is very light, and is limited to small lots to cover immediate requirements. In structural steel there is practically nothing on which fabricators can bid. One new project, of which little is yet known, is a municipal marine terminal at Philadelphia. The American Bridge Co. has taken an order for a 200-ton highway bridge at New Brunswick, N. J.

Bar iron makers continue to quote 3.50c., Pittsburgh, and state that high costs prevent a reduction sufficient to compete with 2.70c. steel bars. We quote mill shipments as follows: Steel bars, 2.97c.; shapes, 3.07c.; plates, 3.27c.; common bar iron, 3.77c.; refined bar iron, 5.27c., all New York. Out-of-store prices are as follows: Steel bars, 3.97c.; structural shapes, 4.07c.; plates, 4.27c.; No. 10 blue annealed sheets, 5.17c.; one-pass cold-rolled black sheets, No. 28 gage, 6.22c.; No. 28 galvanized sheets, 7.57c.; hoops, 4.57c.; bands, 3/16 in., Nos. 10 and 12, 4.57c.; shafting, plus 9 per cent off list.

Cast Iron Pipe.—Eastern shops have decided to meet the reduction made in the Central West and South and quotations have been marked down an additional $2. No new business of importance has developed to test these new prices, which are for 6-in. and heavier, $62.70, New York; for 4-in., $65.70; for 3-in., $72.70, and $1 additional for class A and gas pipe.

Old Material.—Owing to the very limited demand for mixed borings and turnings for blast furnace use, the price has declined sharply and while some sales are reported at from $5 to $6 others have been made at from $3 to $3.50. The strike at local foundries, due to the demand of molders' helpers for the 8-hr. day and a wage of 65c. per hr., has curtailed the local market in cast scrap and the sales now being made are almost entirely for points outside of New York and Brooklyn. The market is very much demoralized. Prices brokers are quoting to dealers per gross ton, New York, follow:

Heavy melting steel	$11.00 to $12.00
Rerolling rails	14.50 to 15.00
Relaying rails, nominal	50.00 to 55.00
Iron and steel car axles	22.00 to 24.00
No. 1 railroad wrought	19.00 to 20.00
Wrought-iron track	15.00 to 16.00
Forge fire	11.00 to 12.00
No. 1 yard wrought, long	16.00 to 17.00
Light iron	5.00 to 6.00
Cast borings (clean)	9.00 to 10.00
Machine shop turnings	7.00 to 8.00
Mixed borings and turnings	3.50 to 6.00
Iron and steel pipe (1 in. minimum diameter), not under 2 ft. long	12.00 to 13.00
Stove plate	15.00 to 16.00
Locomotive grate bars	15.50 to 16.50
Malleable cast (railroad)	15.00 to 16.00
Old carwheels	23.00 to 24.00

Prices which brokers are quoting to dealers in New York and Brooklyn, per gross ton, are:

No. 1 machinery cast	$21.00 to $22.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	17.00 to 18.00
No. 1 heavy cast, not cupola size	15.00 to 16.00
No. 2 cast (radiators, cast boilers, etc.)	16.00 to 17.00

Cincinnati

CINCINNATI, Jan. 28—(*By Wire*).

Pig Iron.—Stove foundries are buying a few carload lots of high phosphorus iron from Southern makers to even up their mixtures. No first half contracts for Southern foundry iron have been made lately, and at the present time the freight differential in favor of Northern makers stands in the way of anything except special analysis Southern iron entering this market. The majority of Southern furnaces are not inclined to make concessions and such iron as they are selling is on a strictly analysis basis. It is rumored that before making any reductions furnaces in the South will blow out unless the cost of production is reduced considerably. Already several furnaces there have shut down for an indefinite period for repairs. Some iron is being piled in the South, and southern Ohio furnaces are also accumulating small stocks. It is generally conceded that if an outlet for Southern foundry iron is not found in the export trade or elsewhere it will be difficult to compete with Northern furnaces, although a demand may develop that will absorb the output of furnaces in districts having cheaper rates than from Birmingham. Just now every one seems to be willing to await developments, hoping that the situation will clear itself at an early date. Present very low prices on scrap have had a somewhat depressing effect on both foundry and steel-making irons. The market is simply a waiting one.

Based on freight rates of $3.60 from Birmingham and $1.80 from Ironton, we quote, f.o.b. Cincinnati:

Southern coke, Nos. 1 foundry and 1 soft, silicon, 2.75 to 3.25	$37.60
Southern coke, Nos. 2 foundry and 2 soft, silicon, 2.25 to 2.75	35.85
Southern foundry silicon, 1.75 to 2.25	34.60
Southern gray forge	33.60
Ohio silvery, 8 per cent silicon	49.30
Southern Ohio coke, No. 1	34.05
Southern Ohio coke, No. 2	32.80
Southern Ohio coke, No. 3	32.30
Southern Ohio malleable Bessemer	33.30
Basic, Northern	31.80
Standard Southern carwheel	51.60

British Iron and Steel Output

Decrease of About 200,000 Tons in Both Iron and Steel—Stocks to Be Liquidated

(*By Cable*)

LONDON, ENGLAND, Jan. 25.

Spot stocks belonging to the Government and awaiting disposal on Dec. 31 included the following: Swedish pig iron, 80,000 tons; shell steel billets, 210,000 tons; American ship plates, 20,000 tons; bright steel, 5000 tons; Swedish bar iron, 10,000 tons. The bulk of the Government commitments with America has been canceled and the stocks of shell steel in the United States are being liquidated in that country. Outstanding commitments that are due to arrive here include 40,000 tons of American basic iron, 7500 tons of American and 2500 tons of Canadian wire rods, and 4000 tons of Swedish pig iron.

The weekly average output in the United States of pig iron in 1918 was 175,000 tons, against 179,000 tons in 1917 and 173,000 tons in 1914. The output of steel ingots and castings was 184,000 tons in 1918, against 187,000 tons in 1917 and 151,000 tons in 1914.

Germany's Need of Iron Ore

WASHINGTON, Jan. 28.—The Bureau of Foreign and Domestic Commerce has received an interesting report from Consul General Albert Halstead at Stockholm on Germany's demand for Swedish iron ore. Mr. Halstead quotes from the Stockholm *Dagblad* the following:

"The scarcity of raw material in the Rhenish-Westphalian industrial district has resulted in the great German iron companies becoming rather anxious, and they are now turning to Sweden in the hope of obtaining the necessary material.

"Quite recently a representative for a large German syndicate visited Sweden in order to purchase 500,000 to 600,000 tons of iron ore. This quantity should be placed at this company's disposal for immediate delivery. However, such a quantity of ore is not obtainable in Sweden at present. The quantity at disposal is between 70,000 and 80,000 tons.

"A short time ago, a representative of another German syndicate, including not less than 11 of Germany's largest factories, arrived in Sweden. Even here it is a question of large deliveries. The cutting off of Germany from the ore districts in Elsass and Poland is affecting the German interests in a very marked way. A few contracts have as yet not been concluded with the German syndicates, as it is very uncertain how the situation in Germany will develop."

Long & Allstatter Annual Meeting

At the annual meeting of the Long & Allstatter Co., Hamilton, Ohio, held Jan. 20, the following officers were elected to serve during the ensuing year: President, W. N. Rumely, of Chicago; vice-president and general manager, F. Pierce Long; secretary, Louis A. Pfau; treasurer, Ralph E. Clark, and general superintendent, D. Paul Long. The company's new foundry addition to its High Street plant is nearing completion.

British Iron and Steel Market

Tin Plate Higher and America Sells to Japan—Drop in Ocean Freights Embarrassing—Conditions in Lorraine

(By Cable)

LONDON, ENGLAND, Jan. 28.

The labor position is becoming acute. There are threatened and actual strikes. The output of pig iron is deficient and the demand for foundry iron far exceeds the supply, which is limited by furnace conditions.

Export business is very much restricted and movement to France and Italy is in a state of congestion. Licenses are unobtainable for neutral nations, which are clamoring for supplies. Old steel contracts are being canceled because the export buyers refuse to pay the prices demanded, but some new business is being booked. There are a few inquiries for rails, steel ties and fish plates. Tin plates have been advanced to 33s 3d (about $8) for home trade and allied government orders, while neutrals are paying up to 40s (about $9.50). America has taken Japanese orders, quoting $6.70 at works. Tin bars have advanced to £12 5s 9d at steel works, now including the subsidy to the Government of 13s 3d.

The fresh reduction in Atlantic freight charges is a serious matter to importers who are already unable to liquidate stocks of wire nails, etc.

About one-third of the Meurthe et Moselle district blast furnaces can be re-started in three to six months provided the tuyeres and incidental apparatus can be replaced. One-third had blowing engines removed and one-third were completely destroyed. Steel works generally were wiped out except the Chiers plant at Longwy, where part of the Bessemer plant is preserved, and Senelle Maubeuge, where the blooming mill remains.

Following are the government fixed prices for steel per gross ton except where otherwise stated, f.o.b. makers works, the figures in parentheses being the official domestic prices obtaining for the period beginning Feb. 1 and the others the official export prices:

Hematite pig iron: East Coast, £8 12s. 6d. (£6 2s. 6d.); West Coast, £8 17s. 6d. (£6 7s. 6d.).
Ship, bridge and tank plates, £16 10s. (£14).
Boiler plates, £17 10s. (£15).
Ship, bridge and tank plates, thin, £19 10s. (£17).
Small angles tees and flats, £20 (£16 10s.).
Beams, £16 2s. 6d. (£13 12s. 6d.).
Rails, 60 lb. per yd. and upward, £15 10s. (£13 7s. 6d.).
Rounds, squares and hexagons, £17 10s.)£14 5s.).
Billets and slabs for rolling, £13 10s. (£11 12s. 6d.).
Billets and slabs for forging, £15 (£12 15s.).
Bar iron, £20 (£16 5s.).
Tin plate, coke, 14 x 20, 112 sheets, 108 lb., f.o.b. Wales, 40s. to neutral countries; otherwise, 33s. 3d.
Tin plate bars, (£12 5s. 9d.).

Reduced Shipments at Youngstown

YOUNGSTOWN, OHIO, Jan. 27.—Because of reduced shipments, a break in the steady operation of district mills is looked for during the next few weeks. Mills started the week with well sustained operations. The Youngstown Sheet & Tube Co. has four open hearth furnaces idle and several tube mills, affecting 1000 men. The Republic Iron & Steel Co. is operating its finishing mills about 80 per cent of normal, and its open hearth furnaces only 50 per cent. Sheet, tin plate and plate mills are working on better schedules than any other finishing departments. To date operators have adopted every expedient to keep schedules as normal as possible, stocking the product where possible. In the face of a falling market, however, they are indisposed to run mills on stock.

Big orders from the railroads and building sources are not being placed and the mills are suffering proportionately. Business now being booked is mainly for urgent requirements and for small enterprises.

The Liberty Steel Co., Warren, Ohio, announces the opening of sales offices in the Woolworth Building, New York. J. B. DeWolf will be district sales manager.

Society of Automotive Engineers' Meeting

The Society of Automotive Engineers will hold its annual meeting in New York, Feb. 4-6. Besides the meeting of the standards committee, Feb. 4, and special social features to be held evenings, Feb. 5 and 6, there are to be four professional sessions. At the opening session on the morning of Feb. 5 Lieut.-Col. Herbert W. Alden and Wm. G. Wall will speak respectively on the subjects of "Tanks," and "Automotive Ordnance Apparatus," including tractors and artillery trucks. The "Principles of the Wheeled Farm Tractor" will be discussed by Edward R. Hewitt, and "Automotive Applications of Marine Engines in the War" by George F. Grouch. The afternoon session, Feb. 5, is to be devoted to consideration of automobile subjects. What may be termed the keynote session of the meeting is to be held Thursday morning, Feb. 6. This session is to be devoted to consideration of the present fuel situation. President Kettering will open the session with a talk on "More Efficient Utilization of Fuel."

Other papers to be presented at this meeting include one by Dr. David White, chief geologist of the U. S. Geological Survey, entitled "The Unmined Supply of Petroleum in the United States," one on the "Present Status of Refinery Practice in the United States" by Dr. E. W. Dean of the Bureau of Mines, and a third on the "Status of Engine Efficiency in the United States" by Dr. H. C. Dickinson of the National Bureau of Standards. The afternoon Thursday, Feb. 6, is to be given over to the subject of aeronautics. J. G. Vincent, vice-president Packard Motor Car Co., and formerly chief of the Airplane Engineering Division, Bureau of Aircraft Production, one of the original designers of the Liberty engine, is to give a paper on this engine which recites many extremely interesting historical facts, outlines completely the engineering problems involved in designing the engine and explains how these were met.

A paper on "Fixed Radial Cylinder Engines" which some believe will see wide development for aeronautic use is to be given by John W. Smith. Lieut. Alexander Klemin, U. S. Air Service, is to discuss "Proportioning Airplanes to Their Engines." Grover C. Loening is to present a paper on "Making the Airplane a Utility." Problems of the Naval aircraft factory will be explained by Commander F. G. Coburn.

Wage Reduction Expected

YOUNGSTOWN, Ohio, Jan. 27.—Sharp reduction in the wages of sheet mill workers is looked for at the next bi-monthly settlement, March 10. This settlement is based on the average selling price of Nos. 26, 27 and 28 gage black sheets, which were found, at the last examination early this month, to be selling for an average price of $5.25. This was an advance of 25c. per 100 lb. over the two months previous, and was principally due, say manufacturers, to the sudden release of high priced orders held on the books for several months before the war's end. Since then, however, there has been a subsidence in orders and a recession in price. The average price of No. 28 gage black sheets, as disclosed this month, for November and December last, was $5.30, whereas the present quotation is $4.70. Settlement on the latter basis would mean a reduction of 15½ per cent of the base wage rate from the rate prevailing in January and February.

Lukens Mill Rolls Plates 198½ In. Wide

The largest plates ever rolled in any plate mill in the world were made a few days ago on the new 204-in. mill of the Lukens Steel Co., Coatesville, Pa. These were circles sheared to 198½ in. in diameter, which will be flanged at the Lukens mill into front and back heads for Scotch marine boilers, 15 ft. 3 in. outside diameter, of 1⅛ in. thickness. These heads are not only the largest ever produced, but are larger than the Lukens Steel Co. expected to be able to make on its new 204-in. mill. The largest ingot ever rolled at the Lukens plant, weighing 31,000 lb., was put through these rolls into marine boiler plate 1 17-32 in. thick.

The U. S. Steel Pension Fund

A total distribution of $709,059.82 in pensions for the year 1918 has just been announced in the eighth annual report of the United States Steel and Carnegie Pension Fund. This is below the totals for both 1916 and 1917, being less than that of the latter year, the high water mark, by $3,446.83. The sum was awarded among the employees of the United States Steel Corporation and its subsidiary companies, the number eligible for the past year being 2861. The recipients were all employees who had become permanently or totally incapacitated for vigorous work and who had been in the service of the corporation 25 years or longer, and were 65 years old in the case of males and 55 in that of females.

The total amount apportioned since this fund was started on Jan. 1, 1911, is $4,367,107.55. The money given out this year is nearly three times that of the first year, when the figures were $281,457.37. Carnegie Steel Co. employees reaped the heaviest awards with a total for the year of $160,620.31; those of the Homestead Works, a part of the Carnegie company, secured the largest amount of any plant in any of the allied companies, a total of $35,687.20.

The American Steel & Wire Co. stood second with $141,869.58. Among the individual works, the National Works of the National Tube Co. is listed second with $34,690.68. On Jan. 1, 1918, there were 2933 former employees receiving pensions; there were added during the year 214, making a total of 3147. During the same year there were discontinued because of death 286, leaving the number 2861 on Jan. 1, 1919.

The amounts awarded since the inception of the fund by years are as follows: 1911, $281,457.37; 1912, $358,780.92; 1913, 422,815.14; 1914, $511,967.90; 1915, $659,389.42; 1916, $711,130.33; 1917, $712,506.65; 1918, $709,059.82.

The fund from which the pensions are made consists of $12,000,000, one-third of which was established by Andrew Carnegie prior to the foundation of the Steel Corporation, the rest of which was set aside by the corporation.

Willys-Overland Co.'s Profit Sharing Plan

Ten thousand employees of the Willys-Overland Co. of Toledo, Ohio, will be benefited by the half-and-half profit-sharing plan, announced this week. The distribution will amount to hundreds of thousands of dollars and it has been estimated by officers of the company that the share of no employee will be less than $100 a year. The awards will be based on the employee's length of service, and individual and departmental efficiency. The tentative plan covers two years, starting with Jan. 1, 1919. If successful to both capital and labor, the scheme will be continued in future years. Announcement was made at the same time of the contemplated enlargement of the Overland plant to take care of the additional volume of business which is expected because of the purchase of the Moline Plow Co., whose equipment will be used for making farm tractors. The officers state that the profit-sharing scheme is expected to counteract any tendencies toward Bolshevism or anarchy among its employees.

Donner Steel Co., Inc., 475 Abbott Road, Buffalo, has had plans prepared for three additions to its plant to cost about $72,000. The structures will include a one-story extension to the open-hearth department, about 80 x 140 ft., to cost $12,000; building, 84 x 500 ft., to cost $45,000; and one-story structure about 28 x 200 ft., to cost $15,000. The company has arranged for a new issue of $3,000,000 in preferred stock, the proceeds to be used in part for proposed works extensions and betterments.

Recent contracts awarded the Austin Co., Cleveland, include five buildings for the Air Reduction Co. at Boston, to cost approximately $40,000, construction to be completed in 30 working days, and a building for the American Engineering Co., Philadelphia, to be completed in from 60 to 75 working days, to cost about $45,000.

IRON AND INDUSTRIAL STOCKS

Trading Fails to Show Expected Stimulation Under Free Money Conditions

NEW YORK, Jan. 27.

The removal of restrictions on money in Stock Exchange transactions, easily the most important influence on trading last week, caused only a slight and temporary stimulation. Prior to the first intimation of this action, on Friday, the market was dull and unresponsive. Immediately thereafter activity broadened and stocks advanced. On Saturday United States Steel common rose 1½ points to 94, closing at 91⅝, as compared with 88¾ on Tuesday, the lowest quotation in 10 months. Closing levels were only slightly higher than the week before.

The range of prices on active iron and industrial stocks from Tuesday of last week to Wednesday of this week was as follows:

Allis-Chalm. com.	30½-32⅝	Lake Supr. Corp.	17⅝-20¼
Allis-Chalm. pf.	81⅞-82¼	Midvale Steel	41½-42¾
Am. Can com.	45⅞-47½	Nat.-Acme	30 - 30⅝
Am. Can pf.	100¾-101⅝	Nat. En. & E. c.	48 - 49½
Am. Car & F. c.	88¾-91⅝	N. Y. Air Brake	105
Am. Car & F. pf.	114⅞-115¼	Nova Scotia Steel	50 - 53⅞
Am. Loco. com.	58¾-61	Pressed Steel c.	62¼-64½
Am. Loco. pf.	101⅛-102¾	Ry. Steel Spg. c.	71 - 74
Am. Ship com.	104	Ry. Steel Spg. pf.	106
Am. Steel Fdries	78½-81	Republic com.	72⅛-74⅞
Bald. Loco. com.	66⅜-73	Republic pf.	101½
Beth. Steel com.	56½-61	Sloss com.	51 - 52½
Beth. Steel cl. B	56½-61⅜	Superior Steel	32¼-34
Case (J. I.) pf.	93½	Transue-Williams	37⅝-38
Chic. Pneu. Tool	62 - 63	Un. Alloy Steel	37½-38¼
Colo. Fuel	35⅛-37	U. S. Pipe com.	14 - 15⅝
Cruc. Steel com.	53¼-55	U. S. Pipe pf.	45 - 45⅝
Deere & Co. pf.	95½-96½	U. S. Steel com.	89½-94
Gen. Electric	149 -150	U. S. Steel pf.	114⅝-115¼
Gt. No. Ore Cert.	36¼-38½	Va. I., C. & Coke	56
Gulf States Steel	51½-53	Warwick	8¾
Int. Har. com.	112⅝-113¼	Westingh. Elec.	40⅝-42
Lackaw. Steel	63 - 67¼		

Dividends

The Bethlehem Steel Co., quarterly, 1¼ per cent and extra 1¼ per cent on the common, 1¼ per cent and extra 1¼ per cent on class B, 2 per cent on the cumulative convertible preferred and 1¾ per cent on the non-cumulative preferred, all payable April 1.

The Kelsey Wheel Co., Inc., quarterly, 1¾ per cent on the preferred, payable Feb. 1.

The National-Acme Co., quarterly, 75c., payable March 1.

The Pressed Steel Car Co., quarterly, 2 per cent on the common, payable March 4, and 1¾ per cent on the preferred payable Feb. 25.

The Sloss-Sheffield Steel & Iron Co., quarterly, 1½ per cent on the common, payable Feb. 10.

The Stewart-Warner Speedometer Co., quarterly, 2 per cent, payable Feb. 15.

The United States Cast Iron Pipe & Foundry Co., quarterly, 1¾ per cent on the preferred, payable March 15.

Badenhausen Co. Fails

The Badenhausen Co., 1425 Chestnut Street, Philadelphia, manufacturer of boilers, etc., with works at Cornwells, Pa., has been placed in the hands of a receiver, due, it is said, to the cancellation of war contracts. The assets are stated to be about $3,000,000 and liabilities $1,600,000. The company is a Delaware corporation, capitalized at $2,800,000, and has recently been erecting additions to its Cornwell works. The receivership resulted by the filing of a bill in the United States District Court by Morris Wheeler & Co., a creditor to an amount of $50,000. John J. Foulkrod, Jr., has been appointed receiver, with consent of John P. Badenhausen, president of the company.

Will Build Sheet Mill

The erection of a new sheet mill in Sebring, Ohio, is contemplated by the Strong Mfg. Co., maker of enamel ware, of which O. H. Sebring has recently secured the controlling interest. The capacity of the enamel ware plant will be doubled, and it is proposed to build the rolling mill plant to manufacture sheets for the company's own use in making enamel ware.

The Shenango Furnace Co., Pittsburgh, has blown out its No. 1 furnace at Sharpsville, Pa., for relining and repairs, which will take about six weeks to complete. The company is still operating its Nos. 3 and 4 stacks at Sharpsville.

Metal Markets

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Tin,	Lead		Spelter	
Jan.	Lake	Electro-lytic	New York	New York	St. Louis	New York	St. Louis
22	20.00	20.00	*71.50	5.40	5.10	7.10	6.75
23	20.00	20.00	*71.50	5.40	5.10	7.10	6.75
24	20.00	20.00	*71.50	5.40	5.10	7.10	6.75
25	20.00	20.00	....	5.40	5.10	7.10	6.75
27	20.00	20,00	*71.50	5.30	5.00	7.10	6.75
28	20.00	20.00	*71.50	5.30	5.00	7.10	6.75

*Nominal.

NEW YORK, Jan. 28.

Inactivity continues to pervade all the markets. Copper is being bought only in small quantities. The tin market is absolutely dead. Lead continues to recede with business of small proportions. Spelter is lifeless. Antimony is quiet.

New York

Copper.—Prices for copper are unchanged at 20c. per lb., New York, for early delivery, although unconfirmed reports are that as low as 19c. has been done on small lots. Demand is very light and there has been recently no fair test of the market. Purchasing is confined to necessary filling-in orders here and there. Production continues to be curtailed everywhere. It is common opinion that until the present large stocks of both crude and refined copper, as well as the large amount of scrap copper springing up from everywhere, are lowered, no level will be reached where a general business can be done. The entire market is a waiting one.

Tin.—There is absolutely no activity. The quotation for spot Straits, New York, continues nominal at 71.50c. and the official quotation of the allocated metal is 72.50c., New York. Buyers are generally taking the stand that they can await developments, refusing to absorb any more of the allocated metal than necessary, realizing also that the 72.50c. price is about 20c. per lb. above what tin for shipment from the Far East could be purchased for if imports were possible. It is understood that the Babbitt and solder makers could not as a whole be persuaded to take their portion of the Government tin at a recent meeting. There are rumors that there is to be some curtailment of American smelters, but there is nothing definite obtainable.

Lead.—The market is spotty with sales slow. There has been but little inquiry, not enough to sustain the market, and as a consequence quotations have fallen, until yesterday metal for early delivery was obtainable as low as 5.30c., New York, or 5c., St. Louis. Very little business has been done the past week.

Spelter.—It is claimed that the present quotation of 7.10c., New York, or 6.75c., St. Louis, for prime Western for January-February delivery is less than cost of production. Demand continues very light with galvanizers and other consumers buying only what they absolutely need and only for early delivery.

Old Metals.—Inquiries by consumers have been more frequent this week though actual business is still light. Dealers' selling prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	18.50
Copper, heavy and wire	18.00
Copper, light and bottoms	15.00
Brass, heavy	12.50
Brass, light	10.00
Heavy machine composition	18.50
No. 1 yellow rod brass turnings	10.00
No. 1 red brass or composition turnings	15.00
Lead, heavy	4.50
Lead, tea	3.25
Zinc	5.25

Antimony.—The market is stagnant and very dull, with quotations unchanged at 7.50c., New York, duty paid for wholesale lots for early delivery.

Aluminum.—Government maximum prices for No. 1 virgin metal and for scrap are effective until March 1 at 33c. per lb. for 50-ton lots, 33.10c. per lb. for 15 to 50-ton lots, and at 33.20c. per lb. for 1 to 15-ton lots.

Chicago

JAN. 28.—The Government price for pig tin has been made 72.50c for any quantity, but deliveries are uncertain and in the outside market up to 78c has been paid. The demand is light. Considerable copper is being melted, but business is confined to prompt lots sold by second hands. Lead has been fairly active, but the market is weak, despite the assertion of the producers that they are selling under cost. Spelter is quiet and weak. Antimony has been fairly active in spot lots of moderate size. We quote copper at 22c. to 23c. for carloads; tin, 75c to 77c.; lead, 5.25c.; spelter, 7c.; antimony, 8.50c. to 9c. On old metals we quote copper wire, crucible shapes, 15.50c.; copper clips, 15c.; copper bottoms, 14c.; red brass, 15c.; yellow brass, 10c.; lead pipe, 4.25c.; zinc, 4.50c.; pewter, No. 1, 30c.; tinfoil, 35c.; and block tin, 45c.

St. Louis

JAN. 27.—The non-ferrous metals markets have been dull and weak for the most part, with lead in car lots selling at 5.15c. offered and spelter at 6.90c. for January and 6.85c. for February shipment. The less than car lot figures are: Lead, 5.65c. to 5.75c.; spelter, 7.50c. to 7.75c.; tin, 76c.; copper, 23c.; Asiatic antimony, 9c. In the Joplin market, the ore situation was discouraging to the holders who found little disposition on the part of smelters to take the supplies offered, with the result that zinc blende, top grade, sold around $52.50 and down as low as $40 per ton for second grades, basis of 60 per cent metal, with the average for the week for the general district approximately $46 per ton. Calamine was quiet at $30 to $40 per ton, basis of 40 per cent metal, with the average for the week about $36 per ton. Lead was dull and down to $60 per ton, basis of 80 per cent metal, and the district average was the same figure. On miscellaneous scrap metals we quote dealers' buying prices as follows: Light brass, 8c.; heavy yellow brass, 11c.; heavy red brass, 16c.; light copper, 14.50c.; heavy copper and copper wire, 16c.; zinc, 4c.; lead, 4c.; tea lead, 4c.; pewter, 40c.; tinfoil, 45c.

Meetings on Screw Thread Standardization

The National Screw Thread Commission held meetings at the Bureau of Standards, Washington, D. C., Jan. 20 to 22, inclusive, to consider final recommendations and form of final report. The committees on pitches, systems and forms of thread, classification, gaging and terminology, held sessions on Jan. 20 and 21, and considered the reports of the respective subcommittees, but left several important matters for final decision at the meeting of the commission as a whole. During the morning session of Jan. 22, F. G. Echols, chairman of the Tap and Die Manufacturers' Association, gave an address on tap tolerances.

The commission will meet in Washington Feb. 17 to vote upon and sign the final report which will then be published.

Brier Hill Steel Co.'s Earnings

YOUNGSTOWN, OHIO, Jan. 28—(*By Wire*)

A. E. Adams, banker, was elected director of the Brierhill Steel Co. to succeed Henry H. Stambaugh, at the seventh annual meeting today. The report of President W. A. Thomas showed that shipments last year were 467,925 tons; net earnings and income $4,470,792.84, after charging out all expenses and setting aside estimated income and excess profits taxes of $3,800,000. The surplus at the close of the year was $19,197,819.80; net current assets were $8,074,710.10, and plant and property investments $29,595,674.48. All the old officers were re-elected.

The Aspromet Co. of Pittsburgh announces the opening of a sales office in the Schmulbach building, Wheeling, W. Va., under the direction of E. A. Short.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight rates from Pittsburgh on finished iron and steel products, including wrought iron and steel pipe, with revisions effective Nov. 1, 1918, in carloads, to points named, per 100 lb., are as follows: New York, 27c.; Philadelphia, 24.5c.; Boston, 30c.; Buffalo, 17c.; Cleveland, 17c.; Cincinnati, 23c.; Indianapolis, 25c.; Chicago, 27c.; St. Louis, 34c.; Kansas City, 59c.; St. Paul, 49½c.; Denver, 99c.; Omaha, 59c.; minimum carload, 36,000 lb. to four last named points; New Orleans, 38.5c.; Birmingham, 57.5c.; Pacific Coast, $1.25; minimum carload, 80,000 lb. To the Pacific Coast the rate on steel bars and structural steel is $1.315, minimum carload 40,000 lb.; and $1.25, minimum carload 50,000 lb. On wrought iron and steel pipe the rate from Pittsburgh to Kansas City is 50c. per 100 lb., minimum carload 46,000 lb.; to Omaha, 50c., minimum carload 46,000 lb.; to St. Paul and Minneapolis, 49.5c., minimum carload 46,000 lb.; Denver, 99c., minimum carload 46,000 lb. A 3 per cent transportation tax applies. On iron and steel items not noted above, rates vary somewhat and are given in detail in the regular railroad tariffs.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in. angles, 3 to 6 in. on one or both legs, ¼ in. thick and over, and zees, structural sizes, 2.80c.

Wire Products

Wire nails, $3.50 base per keg; galvanized, 1 in. and longer, including large-head barb roofing nails taking an advance over this price of $2, and shorter than 1 in., $2.50. Bright basic wire, $3.35 per 100 lb.; annealed fence wire, Nos. 6 to 9, $3.25; galvanized wire, $3.95; galvanized barb wire and fence staples, $4.35; painted barbed wire, $3.65; polished fence staples, $3.65; cement-coated nails, $3.40 base; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 58 per cent off list for carload lots, 57 per cent for 1000-rod lots, and 56 per cent off for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large structural and ship rivets.....$4.40 base
Large boiler rivets.....$4.50
7/16 in. x 6 in. smaller and shorter rivets..
50-10 per cent off list
Machine bolts h.p. nuts, ⅜ in. x 4 in.:
Smaller and shorter, rolled threads....50-10-5 per cent off list
Cut threads.....50-5 per cent off list
Larger and longer sizes.....40-10 per cent off list
Machine bolts, c.p.c. and t. nuts, ⅜ in. x 4 in.:
Smaller and shorter.....40-10 per cent off list
Larger and longer.....35-5 per cent off list
Carriage bolts, ⅜ x 6 in.:
Smaller and shorter, rolled threads.....50-5 per cent off list
Cut threads.....40-10-5 per cent off list
Larger and longer sizes.....40 per cent off list
Lag bolts.....50-10 per cent off list
Plow bolts, Nos. 1, 2, 3.....50 per cent off list
Hot pressed nuts, sq., blank.....2.50c. per lb. off list
Hot pressed nuts, hex., blank.....2.30c. per lb. off list
Hot pressed nuts, sq., tapped.....2.30c. per lb. off list
Hot pressed nuts, hex., tapped.....2.10c. per lb. off list
C.p.c. and t. sq. and hex. nuts, blank....2.25c. per lb. off list
C.p.c. and t. sq. and hex. nuts, tapped....2.00c. per lb. off list
Semi-finished hex. nuts:
⅜ in. and larger.....60-10-10 per cent off list
7/16 in. and smaller.....70-5 per cent off list
Stove bolts.....70-10 per cent off list
Stove bolts.....2½ per cent extra for bulk
Tire bolts.....50-10-5 per cent off list

The above discounts are from present lists now in effect. All prices carry standard extras.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $57; chain rods, $65; screw, rivet and bolt rods and other rods of that character, $65. Prices on high carbon rods are irregular. They range from $70 to $80, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes 9/16 in. x 4½ in. and heavier, per 100 lb., $3.75; in lots of 200 kegs of 200 lb. each, or more; track bolts, $4.80. Boat spikes, $5.05 per 100 lb., f.o.b. Pittsburgh.

Terne Plate

Prices of terne plate are as follows: 8-lb. coating, 200 lb. $15.75 per package; 8-lb. coating, I. C., $14.80; 12-lb. coating, I. C., $16.50; 15-lb. coating, I. C., $17.50; 20-lb. coating, I. C., $19.75; 25-lb. coating, I. C., $20.00; 30-lb. coating, I. C., $21.00; 35-lb. coating, I. C., $22.00; 40-lb. coating, I. C., $23.00 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars at 2.70c. from mill. Refined iron bars, 5.00c.; common iron bars, 3.50c. in carload and larger lots, f.o.b. mill.

Wrought Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card.

Butt Weld

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
⅛, ¼ and ⅜	47	20½	⅛ and ¼	26	+1
½	51	36½	⅜	27	List
¾ to 3	54	40½	½	31	13
			¾ to 1½	36	20

Lap Weld

2	47	34½	1¼	21	6
2½ to 6	50	37½	1½	28	14
7 to 12	47	33½	2	29	15
13 and 14	37½	..	2½ to 6	31	18
15	35	..	7 to 12	28	15

Butt Weld, extra strong, plain ends

⅛, ¼ and ⅜	43	25½	⅛, ¼ and ⅜	25	8
½	48	35½	½	30	17
¾ to 1½	52	39½	¾ to 1½	36	21
2 to 3	53	40½			

Lap Weld, extra strong, plain ends

2	45	33½	1¼	22	7
2½ to 4	48	36½	1½	28	14
4½ to 6	47	35½	2	30	17
7 to 8	43	29½	2½ to 4	32	20
9 to 12	38	24½	4½ to 6	31	19
			7 to 8	23	11
			9 to 12	18	6

To the large jobbing trade an additional 5 per cent is allowed over the above discounts, which are subject to the usual variations in weight of 5 per cent.

On butt and lap weld sizes of black iron pipe, discounts for less than carload lots to jobbers have been seven (7) points lower (higher price) than carload lots, and on butt and lap weld galvanized iron pipe have been nine (9) points lower (higher price).

Boiler Tubes

The following are the prices for carload lots, f.o.b. Pittsburgh:

Lap Welded Steel		*Charcoal Iron*	
3½ to 4½ in.	37	3½ to 4½ in.	12½
2½ to 3¼ in.	27	3 to 3¼ in.	+ 2
2¼ in.	20½	2½ to 2⅞ in.	+ 4½
1¾ to 2 in.	16	2 to 2½ in.	+19½
		1¾ to 1⅞ in.	+32

Standard Commercial Seamless—Cold Drawn or Hot Rolled

Per Net Ton		Per Net Ton	
1 in.	$334	1¾ in.	$214
1¼ in.	274	2 to 2½ in.	184
1⅜ in.	264	2¾ to 3¾ in.	174
1½ in.	214	4 in.	194
		4½ to 5 in.	214

These prices do not apply to special specifications for locomotive tubes nor to special specifications for tubes for the Navy Department, which will be subject to special negotiation.

Sheets

Makers' price for mill shipments on sheets of United States standard gage in carload and larger lots are as follows:

	Cents per lb.
Blue Annealed—Bessemer	
No. 8 and heavier	3.85
Nos. 9 and 10 (base)	3.90
Nos. 11 and 12	3.95
Nos. 13 and 14	4.00
Nos. 15 and 16	4.10
Box Annealed, One Pass Cold Rolled—Bessemer	
Nos. 17 to 21	4.50
Nos. 22 and 24	4.55
Nos. 25 and 26	4.60
No. 27	4.65
No. 28 (base)	4.70
No. 29	4.80
No. 30	4.90
Galvanized Black Sheet Gage—Bessemer	
Nos. 10 and 11	5.05
Nos. 12 and 14	5.15
Nos. 15 and 16	5.30
Nos. 17 to 21	5.45
Nos. 22 and 24	5.60
Nos. 25 and 26	5.75
No. 27	5.90
No. 28 (base)	6.05
No. 29	6.30
No. 30	6.55
Tin-Mill Black Plate—Bessemer	
Nos. 15 and 16	4.50
Nos. 17 to 21	4.55
Nos. 22 to 24	4.60
Nos. 25 and 27	4.65
No. 28 (base)	4.70
No. 29	4.75
No. 30	4.75
Nos. 30½ and 31	4.80

PERSONAL

W. H. Finley, president American Association of Engineers, will address an open meeting of New York engineers at the Machinery Club, 30 Church Street, on Monday evening, Feb. 10, at 8 p. m., on "Engineering Organization and Its Relation to Public Service." The meeting will be preceded by a dinner at 6:30 p. m. and is under the auspices of the New York Chapter of the American Association of Engineers.

E. N. Kleinbourn, Imex Corporation, New York, will sail for Europe shortly to study business conditions and visit the large metal buyers.

W. W. Macon, managing editor THE IRON AGE, who recently returned from a visit to England, Scotland, Belgium and France as one of a party of business paper journalists who were guests of the British Government, addressed the Fellows Club at Pittsburgh at a luncheon on Jan. 18.

A. C. Cook, sales manager Warner & Swasey Co., Cleveland, sailed from New York Jan. 25 for a two months' business trip to England and France.

With the addition of several associated companies, Jerome B. Taft, advertising manager Quaker City Corporation, has been made advertising director of the Emmons interests, headed by Lewis C., James A. and J. G. Emmons, including the Quaker City Corporation, manufacturers, exporters, importers; the Hulburt Oil & Grease Co., Inc., manufacturer of petroleum products; the Quaker City Steamship Co., Inc., and the Emmons Coal Mining Co. and its subsidiary companies, all of Philadelphia. Mr. Taft was formerly with the Frank A. Munsey Co. and the publicity department of the Bell Telephone Co. of Pennsylvania.

A. W. Preikschat, for many years connected with the testing bureau of the Pullman Co. and later special representative in the purchasing department of the Steel Tube Co. of America, has accepted a position with the Liberty Steel Products Co., Inc., with offices in the McCormick Building, Chicago.

Mark D. Kuhn of C. Dreifus Co., Oliver Building, Pittsburgh, dealers in old material, has returned from a month's visit to Miami, Fla.

Fred Hubbard, formerly at the Ohio works of the Carnegie Steel Co., Youngstown, Ohio, but who went to the Ordnance Department, U. S. Steel Corporation, as chief civil engineer, has resigned and has returned to the Ohio works in his former capacity.

W. D. Crawford, formerly president of the La Belle Iron Works, Steubenville, Ohio, is spending the winter at Miami, Fla.

Harry E. Brosius has been appointed employment expert at Pittsburgh by Secretary of Labor Wilson.

Ensign Samuel L. Cooper, of Cooper, Claypool & Co., Ltd., iron and steel factors, Oliver Building, Pittsburgh, has been placed on inactive duty in the navy, and has assumed his duties with his firm.

C. N. Barney, 115 Broadway, New York, has been appointed local corporate representative for the Worthington Pump & Machinery Corporation of Virginia.

Members of the executive and staff organizations of E. F. Houghton & Co., Philadelphia, gave a farewell dinner to Dr. Milton W. Franklin, consulting engineer for the company for several years, in the Red Room at the Bellevue-Stratford Hotel, Philadelphia, Jan. 21. Dr. Franklin has resigned to become associated with the Remy Electric Co., Anderson, Ind.

Lewis B. Ermeling is now affiliated with the sales department of the Upson Nut Co., Cleveland. For the last 18 months Captain Ermeling has been the special assistant of Brig. Gen. Charles C. Jamieson in Washington, with the exception of two months when he was sent to France with E. R. Stettinius, the second assistant secretary of war.

John H. Gregory, civil engineer, New York, has joined the faculty of the engineering department of Johns Hopkins University, Baltimore, filling the vacancy caused by the death of Capt. Grandville R. Jones, who left the institution to go into the army.

W. V. C. Jackson, who was vice-president of the Briscoe Motor Corporation of Jackson, has been chosen manager of the Auto Body Co. of Lansing. Before joining the Briscoe company two years ago Mr. Jackson was for five years general manager of the A. O. Smith Corporation of Milwaukee, one of America's largest and oldest automobile parts manufacturing concerns. Previous to that connection Mr. Smith was with the Westinghouse interests in Pittsburgh for 11 years.

Norval A. Hawkins, general sales manager Ford Motor Co., Detroit, has resigned and will hereafter devote his attention to personal business interests.

Fred A. Sindeband, Far Eastern representative for Robert Grant, iron and steel merchant, and the Milliken Brothers Mfg. Co., New York, left that city for San Francisco on Jan. 21, whence he will sail for Shanghai, China, at an early date. Mr. Sindeband has been in New York for a few weeks visiting the local headquarters of both organizations.

Huntington B. Crouse of the Crouse-Hinds Co., Syracuse, N. Y., who has been acting as county food administrator, has resigned, effective Jan. 31.

Lieut. Col. F. B. Richards, who has been in the War Department in Washington for the past year, recently resigned his commission and returned this week to Cleveland to resume his duties as member of the firm of M. A. Hanna & Co.

Leo F. Caproni, who was identified with the structural and plate sales department of the New York district of the Bethlehem Steel Co., has joined the sales force of the Hay Foundry & Iron Works, New York, devoting himself to fabricated steel and castings.

William M. Ryan, president Ryan Car Co., Hegewisch, Chicago, has been elected president of the Calumet Manufacturers' Association, organized last month to promote the business interests of the Calumet district, which contains 300 factories.

Lieut. Jack Sullivan, of the United States Army Ordnance Department, is now at Meheun-Syr-Yevre, France, awaiting return to the United States. In civilian life he is connected with the Braddock Mfg. Co., Braddock, Pa., and is a director of the Columbiana Foundry Co., Columbiana, Ohio.

F. E. Norris, general superintendent of the Farrell and Sharon, Pa., works of the Carnegie Steel Co., until he resigned some months ago to become manager of a steel plant in Lyons, France, was in Pittsburgh last week for the purpose of buying steel material and machinery. Mr. Norris states that steel made in this country will be in great demand for export before long and that the largest product that will be needed for export will be machinery.

William K. Swift, of Philadelphia, has become associated with the sales department of the Bound Brook Oilless Bearing Co., Bound Brook, N. J.

J. V. Wiesman, who was chief clerk of the Kokomo Steel and Wire Co., Kokomo, Ind., has been promoted to assistant general superintendent.

L. V. Rockwell, vice-president and general manager of the Millard F. Wilfong Iron Works Co., Philadelphia, has severed his connection with the company. Joseph R. Wilfong has been elected president, and Irwin Fisher, secretary and treasurer.

Warren Worthington, who has been general superintendent of the Donner Steel Co., Buffalo, in charge of engineering and erection, having finished the construction of the new plant and placed it in full operation, has been appointed special engineer in charge of steel mill construction and equipment for the American Steel Export Co., Woolworth Building, New York. This company maintains an engineering staff to design, furnish and equip complete industrial plants in foreign countries.

J. Leonard Replogle, chairman Wharton Steel Co., is now in Cuba on his way to spend a few weeks at Palm Beach, Fla.

OBITUARY

GEORGE TENER OLIVER, steel manufacturer, former United States senator, lawyer, and newspaper publisher, died at his home at Pittsburgh on Jan. 22 at the age of 71. He was director of the Oliver Iron & Steel Co., and chairman of the board of directors of the Oliver & Snyder Steel Co. at the time of his death.

GEORGE T. OLIVER

Most of his life was spent in Allegheny, now a part of Pittsburgh. He attended Pleasant Hill Academy, West Middletown, Pa. and Bethany College, W. Va., from which he was graduated in 1868. Three years later, he was admitted to the bar of Allegheny county, forming a partnership with William B. Rodgers. This connection lasted until 1881, when he went into the manufacturing business, becoming vice-president and later president of the Oliver Wire Co. of Pittsburgh, remaining with the corporation until 1889, when it sold its business to the Consolidated Steel & Wire Co., afterward the American Steel & Wire Co.

At this date he became president of the Hainsworth Steel Co., which was merged with the Oliver & Snyder Steel Co., in 1897. He continued in this capacity for four years longer.

Newspaper publishing was his next enterprise. He purchased the Pittsburgh *Gazette*, and later the *Times*, which he merged as the *Gazette-Times;* he also bought the *Chronicle-Telegraph*. Newspaper activities brought him into the field of local, State, and national Republican politics. In 1909 he was elected United States senator for the unexpired term of Senator Knox, who had become Secretary of State. He was subsequently elected for a full term of six years, ending March, 1917. Here he gave close attention to tariff matters affecting the iron and steel industry.

Meanwhile he became owner of some valuable real estate properties in Pittsburgh, acquiring the Chamber of Commerce building, superintending the erection of the Henry W. Oliver office building, as administrator for his brother, and building the large department store of McCreery & Co. He was interested in many undertakings outside of his business, serving as trustee of Bethany College, belonging to social and political clubs, and contributing to charities. Senator Oliver stood high in Masonic circles, being a 33 degree Mason, a Knights Templar, and a member of the Mystic Shrine. A brother, David B. Oliver, is a director of the Oliver Iron & Steel Co., Pittsburgh.

COL. BENJAMIN ADRIANCE, aged 69, president of the Adriance Machine Works, Inc., 80 Richards Street, Brooklyn, died in Miami, Fla., on Jan. 3 after a brief illness. He was born in Greenwich village, New York He founded the company which bears his name in 1887. He was also formerly president of the Savage Arms Co., Utica, N. Y. and was president of the Warp Twisting-In Machine Co., Brooklyn at the time of his death. When active with the Savage Arms Co., he made and signed the first contract with the British government for the manufacture and delivery of the Lewis machine gun. He was a member of the National Metal Trades Association and also of the National Manufacturers' Association.

JOHN C. WILSON, president and treasurer, Smyth Mfg. Co., and president, Sigourney Tool Co., Hartford, Conn., died in that city on Jan. 23 of angina pectoris. Born at Mooreland, Ga., 1864, his early experience was in the cotton belt, supplemented by four years of business in England. He returned in 1894 to become secretary and treasurer, Hartford Rubber Works, later being president New Brunswick Rubber Co. In 1903 he was elected president of the Pickering Governor Co., Portland, Me., and in 1913 president of the Smyth Mfg. Co. and of the Sigourney Tool Co. He leaves two children and a widow, daughter of the late John H. Hall, formerly president Colt's Patent Firearms Mfg. Co.

WILLIAM RATTLE, JR., head of W. J. Rattle & Son, chemist, metallurgist, assayer, and mining engineer, Cleveland, died Jan. 21 of influenza after a week's illness, aged 39 years. He specialized on iron ore, metals and coal and was prominently identifies with the iron ore industry through his work for firms selling Lake Superior ores. He had been associated since his graduation from Case School of Applied Science with the business which was established by his father, W. J. Rattle, over 30 years ago.

DR. HARRY C. EVANS, aged 47, chief surgeon of the Carnegie Steel Co. in the Youngstown district, died at Youngstown, Jan. 21, following a brief illness with pneumonia. In January, 1917, he enlisted for foreign service and was assigned by the British to the base hospital at Ris Oranges, France, where he served six months, with the title of major.

JAMES E. HUNTER of the James Hunter Machine Co., North Adams, Mass., died Jan. 19 at the age of 89. Succeeding his father in the control of the business he had been until recently active in its affairs. Born in Scotland he came to New York State when a child, but since 1838 had lived in North Adams.

LEWIS A. PLATT, president Platt Brothers & Co., and treasurer, Patent Button Co., Waterbury, Conn., died at Miami, Fla., Jan. 24, aged 64. He was graduated from Yale in 1879 and served as a state senator in 1910

CORNELIUS TRACY, treasurer Tracy Brothers Co., and president Waterbury Rolling Co., Waterbury, Conn., died on Jan. 24, of apoplexy, aged 65. He had attended a directors' meeting only the day before.

Sixtieth Anniversary Celebration

The Matthew Addy Co., Cincinnati, celebrated the sixtieth anniversary of the foundation of its business by a dinner at the Queen City Club, Cincinnati, Jan. 29. Any account of the affair must await next week's issue, but meanwhile some observations of James A. Green, president of the company, in respect to the commemoration, put a vivid touch to the difference between conditions when Matthew Addy embarked on his venture and those which now obtain. Incidentally when he died, in 1896, he requested his associates that they continue the business in his name. With generosity and foresight he provided capital for this purpose, which capital his associates repaid presently to his estate.

Mr. Green calls attention to the fact that 60 years ago the Lake Superior ore deposits were unknown. "Nor had the Birmingham district been discovered. Pittsburgh was the iron center, but of minor importance. The country still depended for a large portion of its manufactured iron, and even its raw iron, on England. Matthew Addy's real trade consisted of Hanging Rock charcoal irons. There were 70 furnaces in the district, and these were not able in one day to make as much iron as one of the large modern blast burnaces turns out at the present time. Nothing was known of analysis. The iron was brought down the Ohio River and piled on the public landing, and buyers would frequently go and pick out the iron pig by pig, judging of the quality by its fractured surface."

The Wheeler Condenser & Engineering Co., Carteret, N. J., announces that it has obtained from the Schutte & Koerting Co., Philadelphia, through the Alien Property Custodian, the exclusive right to manufacture and sell steam jet air pumps under patent No. 968,926 in connection with surface condensers, jet condensers, barometric condensers, vacuum pans and evaporating apparatus.

Machinery Markets and News of the Works

SLIGHTLY BETTER DEMAND

Machine Tool Sellers See Improvement

Business Quiet in East, But Fair in Middle West —Reports of Price Reductions

From some machine-tool selling centers come reports that both domestic and export demand for equipment is showing improvement. This is particularly true of the Middle West, while in the East business is exceedingly quiet.

Business in new tools in the New York market during the past week has been at a very low point, some selling offices doing scarcely anything. Dealers report a fair demand, particularly for milling machines, radial drills and turret lathes. Many inquiries are being received, but usually are not acted upon, buyers deciding to wait, possibly in the expectation of lower prices.

While probably it is true that a majority of the leading makers of standard tools have not lowered prices, there are persistent reports of concessions here and there by some makers, such concessions, according to report, averaging about 10 per cent.

Second-hand tools from war plants are making their appearance in the East, but dealers are generally refraining from buying such tools outright, and are selling them only on a commission basis. The Russian-Remington Rifle Trustees, Flatiron Building, New York, are offering a list of tools which were originally bought for the making of rifles for Russia at Remington plants.

In Chicago it is reported that January sales of tools will make a good showing. Reports in that market are that a number of tool builders have cut prices from 10 to 20 per cent. Settlement of claims on war contracts is proceeding slowly, and this undoubtedly is a factor in retarding machine-tool demand.

Cincinnati machine-tool builders report a better demand from domestic users. Milwaukee builders say there is a much improved foreign inquiry.

In Detroit approximately $300,000,000 worth of war contracts have been canceled and as practically no adjustment has been made plants are being forced to shut down because of lack of capital.

The Railroad Administration has ordered the suspension of construction work now under way by the Pennsylvania Railroad. Among the projects affected will be the new locomotive shops at Marietta, Pa. This road has notified machine-tool sellers to expect cancellation of orders recently placed for tools. Orders for locomotive cranes have also been canceled, but the builders are strongly protesting.

A conference of locomotive crane builders and Government representatives was held at Cleveland to devise a plan of utilizing the surplus cranes which various Government departments have on hand. The agreement reached between the machine tool industry and the War Department was laid before the crane builders, and it was proposed by Col. La Mar of the War Department that the crane men accept a similar plan. It was the view of the crane manufacturers, however, that the Government should first make an effort to induce the Railroad Administration, the Navy and other Government departments to take as many of the cranes as possible before negotiating with the manufacturers to take them back. Another meeting of the crane manufacturers will be held in Cleveland, Jan. 30, at which a statement will be made up for the Washington authorities showing the value of the cranes to other Government departments than those for which they were purchased. The crane builders pointed out that if the cranes were to be made available for resale considerable modifications would be necessary to make them adaptable for other work than that for which they were originally intended.

New York

NEW YORK, Jan. 28.

Second-hand machine tools from war plants are beginning to appear in the market. A leading machinery house has had a measure of success in disposing of equipment from the former Stevens-Duryea plant at Chicopee Falls, Mass. The International Arms & Fuze Co., Bloomfield, N. J., which was engaged on shells and fuses, will also sell a part of its equipment. Representatives of Russia in this country are also trying to dispose of a large quantity of tools and materials which were bought for the plants of the Remington Arms U. M. C. Co. They are operating under the name of the Russian-Remington Rifle Trustees, and an office has been opened in the Flatiron Building, New York. Second-hand machinery dealers are not speculating in tools under present conditions, and such sales as are being made are handled on a commission basis.

Business in new tools is at a very low point, in some cases sales not being up to the December record. There are sales offices in New York which have done very little, if any, business since the signing of the armistice. Dealers report a fair business. In the past week there has been a fair demand for milling machines, radial drills and turret lathes.

The Cumberland Valley Railroad is receiving bids on two cranes, one of 150-ton capacity and one of 15-ton.

Leo J. Brimm, Inc., 132 Church Street, New York, has been incorporated with a capital of $50,000 to import and export steel balls, automobile, motorcycle and bicycle supplies, succeeding Leo J. Brimm, same address.

The Brooklyn Rapid Transit Co., 85 Clinton Street, Brooklyn, has made application to the United States District Court, through its receiver, Lindley M. Garrison, for permission to issue receiver's certificates to the amount of $16,859,356.96, instead of an appropriation of $9,000,000, as recently considered. Of this amount $6,458,833 is to be used as follows: Extension to electric power plants, with installation of new generating equipment for increased capacity, $2,986,231; 50 new surface cars with equipment, and improvements to present rolling stock, $710,000; and for the purchase of other cars and equipment, $2,000,000. The remaining amount will be used for current obligations. It is also proposed to use part of the fund, aggregating $8,452,731, for the New York Municipal Railway Corporation, now under the jurisdiction of the same receivership, and of which sum $1,000,000 will be used for new construction and equipment, and $2,500,000 for the purchase of new steel subway cars.

The Board of Education, Essex Building, Newark, N. J., will receive bids until Feb. 11 for machinery for the vocational schools, including a 15-in. heavy-duty lathe, metal-planing machine, surface grinding machine, universal milling machine and 16-in. engine lathe. R. O. Beebe is director.

The Fuel Engineering Co. of New York, 106 East Nineteenth Street, New York, has increased its capital from $25,000 to $150,000.

The new galvanizing plant of the Milliken Brothers Mfg. Co., Woolworth Building, New York, for its fabricating works at 136th Street and East River, will be 25 x 100 ft.

The Metals Development Co., Newark, N. J., has been incorporated with a capital of $25,000 by Blasius Hart, Newark; Henry Escher, Jr., Summit, N. J., and Lawson R. Jones, Brooklyn, to manufacture castings, etc.

The General Tube Co., Newark, N. J., manufacturer of metal tubing recently incorporated with a capital of $50,000, has leased property at 56-60 Earl Street for a new works.

The Forest Electric Co., Arlington, N. J., has been incorporated with a capital of $15,000 by James K. Elderin, Daniel S. Dobyns and John W. Oliver to manufacture electrical products.

The Gilmer Iron Works, Hoboken, N. J., will build a new one-story foundry, 100 x 150 ft., on Manhattan Avenue, Jersey City.

The Millwrighting & Machine Co., Belleville, N. J., has filed notice of organization to manufacture machinery parts, with works at 108 Polk Street. Fred Wolf, 67 Floyd Street, heads the company.

The Elizabethtown Water Co., 68 Broad Street, Elizabeth, N. J., is having plans prepared for its proposed one-story pumping plant near Milltown, to cost with equipment about $150,000.

The Perth Amboy Dry Dock Co., Perth Amboy, N. J., will soon commence the construction of a dry dock, with shop and ship repair facilities at the foot of Washington Street, on a site recently acquired from the Raritan Dry Dock Co. The dock will be designed with capacity of about 12,000 tons. Equipment and machinery will be provided for the construction and repair of steel and wooden vessels.

The Ordnance Department, Washington, has issued orders to the Atlantic Loading Co., Amatol, near Atlantic City, N. J., for additional shell-loading work. It is said that the order will keep the works operating for about three months.

The Fortney Mfg. Co., 120 Malone Avenue, Belleville, N. J., has filed notice of organization to manufacture wire products. Lloyd E. Fortney heads the company.

The Zenith Carburetor Co., 245 West Fifty-fifth Street, New York, has leased property at 692 Eleventh Avenue, formerly occupied by the Brockway Motor Truck Co., for a new works.

Grinnell Brothers, Inc., New York, has been incorporated with a capital of $150,000 by L. J. Grinberg, A. and N. H. Grinnell, 529 West 111th Street, to manufacture stoves and heating appliances.

The Dynamic Metal Products Co., New York, has been incorporated with a capital of $50,000 by A. J. Tuck, W. E. Bowman and W. E. Hutson, 485 Fifth Avenue, to manufacture metal specialties.

The Cameron Machine Co., 61 Poplar Street, Brooklyn, N. Y., has increased its capital from $65,000 to $600,000.

The New York Central Railroad, Grand Central Terminal, New York, has had plans prepared for a one-story repair shop, 30 x 50 ft., near West Thirty-first Street and Twelfth Avenue.

The Sterling Die Casting Co., Brooklyn, has been incorporated with a capital of $120,000 by C. Larsen, G. Christensen and G. Clausen, 979 Seventy-fifth Street, to manufacture dies, tools, etc.

The Standard Hollowware Co., New York, has been incorporated with a capital of $10,000 by G. Rosenwald, K. and M. Heyne, 7 Dutch Street, to manufacture metal and iron products, including stoves.

The Ferro Electric Welding Co., Brooklyn, has been incorporated with a capital of $150,000 by A. Mayer, Konrad Furuseth and Oscar Johannessen, 95 East Eighteenth Street, New York, to manufacture electric welding products.

The Sun Light Arc Co., New York, has been incorporated with a capital of $1,000,000 by J. J. Harmer, E. S. Porter and J. S. Dawley, 218 West 148th Street, to manufacture arc lamps, etc.

The Cast-a-Liner Co., Brooklyn, has been incorporated in Delaware with a capital of $100,000, to manufacture mechanical devices, machinery, etc., particularly for railroad service. Harry W. Hendenberg and Jean V. Lutz, Brooklyn, and Samuel B. Thompson, Fanwood, N. J., are the incorporators.

The Hudson Shipbuilding Corporation, Tarrytown, N. Y., is considering the construction of a new one-story shipbuilding works to cost $20,000.

The Tim Patent Muffler Cap Co., New York, has been incorporated with a capital of $10,000 by M. Feigenbaum, M. Feiner and J. A. Tim, 116 West Seventy-second Street, to manufacture metal products.

The Parker Axle & Products Corporation, New York, has been incorporated with a capital of $600,000 by W. C. and C. W. Parker and A. Foshay, 120 Broadway, to manufacture axles, etc.

The Bureau of Yards and Docks, Washington, will install new coal and ash-handling equipment at the Brooklyn Navy Yard to cost about $80,000. Bids for machinery are now being asked.

The United Aircraft Engineering Corporation, New York, has followed its late capital increase to $200,000 by another to $500,000, to provide for proposed expansion. The company was recently incorporated by P. G. Giffin; A. Jones, 55 Liberty Street, and associates.

The New Jersey Art Metal Mfg. Co., Newark, N. J., has filed notice of organization to operate a plant on Washington Street for the manufacture of metal specialties. Etienne Manzone heads the company.

The Beaver Machine & Tool Co., Newark, N. J., has been incorporated with a capital of $250,000 by Anton Felin, E. B. Slade and Hugo Brugmann, to manufacture tools and machinery.

The New Jersey Stamp & Die Works, 393 Halsey Street, Newark, N. J., has filed notice of organization. Stanley Dink, 305 Norfolk Street, heads the company.

The Rockford Fan Co., Utica, N. Y., has been incorporated with a capital of $100,000 to manufacture fans for mechanical service. M. Rockford, 22 Salina Street; W. F. Bond of the Savage Arms Co., Utica, and W. H. Clove, Rome, N. Y., are the incorporators.

The Donahue Mfg. Corporation, New Rochelle, N. Y., has been incorporated with a capital of $25,000 by B. F. Nell, S. Donahue and A. H. Patterson to manufacture automobile accessories.

The Central Hudson Gas & Electric Co., Poughkeepsie, N. Y., has made application to the Public Service Commission for permission to issue securities to the amount of $750,000 for proposed extensions and improvements.

Buffalo

BUFFALO, Jan. 27.

The John T. Moran Machine Co., 103 Grape Street, Syracuse, N. Y., is now operating its recently enlarged plant for the manufacture of special machinery and equipment. An extension has been made to the machine shop with the installation of new tools and equipment. John T. Moran is president.

The Board of Managers, Letchworth Village, Thiells, N. Y., is planning the installation of a boiler plant to cost about $300,000, including boilers and auxiliary equipment. Lewis F. Pilcher, Capitol Building, Albany, N. Y., State Architect, will prepare plans.

The Atterbury Motor Car Co., Elmwood and Hertel avenues, Buffalo, manufacturer of automobiles, has increased its capital from $250,000 to $500,000.

The Carlson Metal Products Co., Buffalo, has been incorporated with a capital of $12,000 by E. Carlson, R. E. Jacobson and F. J. Janson to manufacture metal goods.

The Le Roy Plow Co., Le Roy, N. Y., is planning the rebuilding of its foundry, recently destroyed by fire with loss of about $10,000. C. L. Stevens is vice-president.

The Aladdin Light Display Co., Rochester, N. Y., has been incorporated with a capital of $5,000 by J. L. Coniff, H. G. Morris and R. L. Wallace to manufacture motion picture machinery.

The Phillips & Clark Stove Co., Geneva, N. Y., is planning to close its molding department indefinitely.

The Smart Addressing Machine Corporation, Buffalo, has been incorporated with a capitalization of $1,600,000 to manufacture addressing and other automatic machines. Laurens Enos, George L. Robertson and S. Williams are the incorporators.

Arrangements are being made for the removal of the structural steel works plant of the Warsaw-Wilkinson Co. to Batavia, N. Y. The company's plant at Warsaw, N. Y., was destroyed by fire Jan. 14.

The machine shop of the Sweet Paper Co., Phoenix, N. Y., which was recently destroyed by fire, is to be rebuilt.

New England

BOSTON, Jan. 27.

Improvements to the Ellen C. Manning foundry and machine shop, Portland, Me., have begun and will involve the expenditure of $5,000.

An incinerator is planned for Hull, Mass. Dr. C. P. Sylvester, 460 Audubon Road, Back Bay, Mass., is chairman of the committee.

A six-story factory addition, 23 x 28 ft., to cost $11,000, will be built by the North & Judd Co., New Britain, Conn.

The Standard Envelope Sealer Mfg. Co. has plans in hand for a 65 x 120 ft. factory, two stories, at Everett, Mass.

The Thin Sheet Metal Co. will erect a $65,000 factory building, one story, 48 x 80 ft., at Waterbury, Conn.

The Providence Body Co., Providence, R. I., is planning to proceed with building a factory in the spring.

The plant of the Griffin Car Wheel Co., Chelsea, Mass., was destroyed by fire, Jan. 11, with loss estimated at $90,000. It is reported that the works will be rebuilt.

A portion of the works of the Athol Mfg. Co., Athol, Mass., was destroyed by fire recently with loss estimated at $40,000.

The first steel ship to be constructed in New Hampshire was launched at the plant of the Atlantic Shipbuilding Co., Portsmouth, N. H., Jan. 18. The vessel, named the Kisnop, has a capacity of 11,300 tons; the keel was laid May 23, 1918. The plant has established a record for production, within 11 months having converted the former plant of the Colonial Paper Co., at Freeman's Point into works for building steel ships.

Fire, Jan. 18, destroyed the boiler plant and sawmill at the shipbuilding works of the Russell Shipbuilding Co., Portland, Me., with loss reported at $25,000. It is planned to immediately rebuild.

The American Pipe Bending Machine Co., 39 Pearl Street, Boston, Mass., is about to open up pipe-bending plants in the large cities of the country. The first is about ready for operation at Lowell, Mass. Pipe benders, manufactured by the company, will be used at all these plants, and it will make a specialty of furnishing bent pipe and make delivery of small orders on 48 hr. notice. Each plant will have facilities for turning out from 1000 to 3000 bends per day, and will be in charge of an experienced pipe bender. The company was capitalized at $100,000, but it is about to be reorganized with a capital of $1,000,000 to carry on this business.

Philadelphia

PHILADELPHIA, Jan. 27.

The Railroad Administration has decided to suspend certain construction work now under way for the Pennsylvania Railroad, Broad Street Station, Philadelphia. Among the projects affected will be the new shops and yards at Marietta, erection of which has been commenced, and it is understood that the completion of the engine house, estimated to cost about $500,000, with machine shops and other structures at this location, will be held in abeyance. It is said that the program includes a suspension of work aggregating about $10,000,000.

Machine-tool buyers are marking time, and in some instances the business being done by sellers is not as good as in December. The Barrett Adding Machine Co., Bulletin Building, Philadelphia, bought a small list of tools for a manufacturing shop it will establish at 1210 Race Street. Otherwise buying is confined mostly to single tools.

The Pennsylvania Railroad has been placing a few orders, but at the same time has given notice to sellers that some orders placed within the past few months may be canceled. Sellers are less inclined to consider cancellations from railroads than they are in the case of manufacturing plants which were engaged on war work. The railroads bought tools for permanent improvement, and therefore, it is pointed out, they have no valid reason for canceling, such as the termination of war work gave to manufacturing plants. The Pennsylvania Railroad has also canceled orders for locomotive cranes.

The Worth Steel Co., Claymont, Del., has received bids on a 50-ton overhead traveling crane.

The Dexter Metal Mfg. Co., Front and Arch streets, Philadelphia, manufacturer of metal lockers, etc., has awarded a contract to M. W. Young, Overbrook, Pa., for the erection of a one-story shop, 30 x 300 ft., at Camden, N. J.

William Sellers & Co., 1600 Hamilton Street, Philadelphia, manufacturers of machine tools and other machinery, have taken bids for the erection of a five-story addition, 50 x 108 ft., to be used as a machine shop and for other departments.

The Paramount Typewriter Corporation, Philadelphia, has been incorporated in Delaware with a capital of $1,500,000 by F. R. Hansell, Land Title Building, and E. M. McFarland to manufacture typewriters.

The Philadelphia Steel & Iron Co., Commercial Trust Building, Philadelphia, is building a one-story forge shop addition, 42 x 100 ft., at Thirty-third Street and Grays Ferry Road.

Fire, Jan. 22, destroyed a portion of the plant of the Wilckes, Martin & Wilckes Co., Camden, N. J., manufacturer of lamp black, etc., with loss estimated at about $10,000.

The Sun Shipbuilding Co., Chester, Pa., will build a one-story addition, 48 x 70 ft., at Front Street and Morton Avenue, to cost about $10,000.

The Belmont Motor Corporation, Lewistown, Pa., is arranging to begin operations at its new local plant in March. The works will be fully equipped for the production of motor trucks of one-half ton and larger capacities. J. Nelson Clark, Harrisburg, is vice-president.

The Vulcan Iron Works, Wilkes-Barre, Pa., is considering the erection of a new one-story foundry at Hattinwood, for increased capacity.

The Ingersoll-Rand Co., Athens, Pa., manufacturer of mining machinery, is planning for a one-story addition to cost about $50,000.

The State Board of Health, Harrisburg, Pa., is having plans prepared for a new electric power plant at the Mont Alto Sanatorium.

The Safety Impulse Starter Co., Harrisburg, Pa., has been incorporated in Delaware with a capital of $2,500,000 by E. M. Jauss and M. C. Miller to manufacture starting and lighting equipment for automobiles and trucks.

Fire, Jan. 22, destroyed the No. 5 coal breaker at the properties of the Delaware & Hudson Co., Larksville, near Wilkes-Barre, Pa., with loss, including machinery and equipment, estimated at $300,000.

The City Council, Allentown, Pa., is considering the erection of a municipal electric plant to be operated in conjunction with the city waterworks pumping station. R. J. Wheeler is superintendent of parks and public property.

The Bethlehem Steel Co., Steelton, Pa., will utilize the buildings formerly employed as its No. 2 forge shops, recently shut down, for the electrical department at its works, including warehouse and other structures.

Baltimore

BALTIMORE, Jan. 27.

The Maryland Bolt Co., Continental Trust Building, Baltimore, which recently acquired a plant at Mount Washington, Md., is in the market for lathes, milling machines, drills, saws, bolt trimmers, etc. R. Curzon Hoffman, Jr., is president.

The United States Air Products Co., 407 American Building, Baltimore, has been incorporated with $100,000 capital stock to manufacture automobiles, aeroplanes, engines, motors, etc. The incorporators are Clayton E. Rutledge, Walter B. Leatherman and Wilmer R. Mason.

The Western Maryland Dairy, 1125 Linden Avenue, Baltimore, will build a one-story boiler house, 49 x 74 ft.

Passano-Cope, Inc., Maryland Trust Building, Baltimore, has been incorporated with $100,000 capital stock to deal in machinery, tools, implements, etc. The incorporators are Louis D. Passano and Lauren C. Cope.

Morton McI. Dukehart & Co., Light Street, Baltimore, are planning for the erection of a one-story machine shop, 40 x 100 ft., on the Key Highway, to cost about $15,000.

The E. I. duPont deNemours Co., Wilmington, Del., is considering the remodeling of its works at Hopewell, Va., heretofore devoted to the manufacture of powder, for the production of paper. Recent experiments have been conducted for such manufacture, utilizing cotton fibers and other by-products obtained from the making of explosives.

T. K. Barrett, 111 East Lafayette Avenue, Baltimore, will establish an automobile repair shop at 1201 Hunter Street, for Gladden Brothers. About $1,000 will be spent for tools for light repair work.

The Marine Iron Works Co., Norfolk, Va., has increased its capital stock from $50,000 to $300,000.

The Manganese Steel Casting Co., Norfolk, Va., plans to build a two-story plant, 30 x 60 ft.

The Westbook Elevator Mfg. Co., Danville, Va., may install machinery for the manufacture of scissors and shears and is seeking prices on machinery.

The Richmond Pressed Metal Works, Inc., Richmond, Va., wants prices on machinery for the manufacture of metal window screens.

Prices on 14 x 36 Corliss engines are sought by Hackley Morrison, Moore Building, Richmond, Va.

E. C. Brinser's Sons, Richmond, Va., are considering the construction of a plant for the manufacture of farming implements.

The American Sub-Soil Plow Co., Winston-Salem, N. C., contemplates the construction of a foundry. S. E. Case is general manager.

The Acme Steel Goods Co., 10 Tift Street, Atlanta, Ga., is in the market for one or two drop presses, 24 in. x 24 in., and a light metal 4-ft. break and a 24-in. cut-off foot lever machine, new or second-hand.

The Guilford Lumber Co., Greensboro, N. C., wants prices on 75-hp. steam engines.

Prices on lathes for the manufacture of small buoys and spindles are wanted by the United States Buoy Corporation, Newberry, N. C.

Spartanburg, S. C., contemplates an additional generating unit at its municipal electric light plant.

The Cummus Machinery Co., Spartanburg, S. C., has increased its capital stock from $10,000 to $50,000.

The Chamberlain-Garner Co., Denton, N. C., has been incorporated with a capital of $100,000 by J. W. Cudato, J. O. Barnes and J. W. Snider to manufacture fireless cookers, etc.

The Navy Department, Washington, is planning to increase the present force of boilermakers at the Norfolk, Va., Navy Yard, to enlarge the output of boilers and auxiliary equipment.

The Newport News Shipbuilding & Drydock Co., Newport News, Va., has commenced the erection of a one-story machinery warehouse addition to its works on Virginia Avenue.

The Palmetto Power & Light Co., Raleigh, N. C., has increased its capital from $200,000 to $500,000 for proposed improvements.

Pittsburgh

PITTSBURGH, Jan. 27.

The Pennsylvania Tank Car Co., Sharon, Pa., associated with the Petroleum Iron Works, is considering the erection of a new plant next summer to replace its works recently destroyed by fire and for increased output. The former plant has been temporarily repaired for immediate service.

The Standard Die & Stamping Co., Barker Place, Pittsburgh, is now operating its plant on a pre-war basis, specializing in stamping and drawing work, die production and general machine work.

The United States Chain & Forging Co., Pittsburgh, has been incorporated in Delaware, with capital of $8,000,000 to manufacture iron and steel chains and other metal products. J. Albert McKay, Pittsburgh, S. F. MacConkey and John T. Arbett, Columbus, Ohio, are the incorporators.

The Carbon Steel Co., Pittsburgh, will build a one-story boiler plant, 40 x 160 ft.

The Pittsburgh Coal Co., Oliver Building, Pittsburgh, is building new buildings at its plant at Library, Pa., to cost about $50,000. Among the structures a one-story machine repair shop will be constructed.

The Chaplin-Keener-Kerr Co., Farmers' and Merchants' Bank Building, Morgantown, W. Va., recently organized, is planning the erection of a plant for the manufacture of metal products.

The Wheeling Steel & Iron Co., Benwood, W. Va., is building a one-story and basement addition, 50 x 100 ft.

Chicago

CHICAGO, Jan. 27.

It is generally agreed by the sellers of machine tools that January's total of sales will make a good showing, the aggregate being much better than was expected. A few sales embraced groups of several tools, the Chicago & Alton list being the most notable, and coupled with this business there has been many widely scattered transactions in each of which one or two machines figured. The number of small lists which have been in the market has been surprising. Many of these expected to find prices much lower than they are, but nevertheless business resulted.

It is commonly reported that not a few tool builders have cut their prices all the way from 10 to 25 per cent, and have done so despite the general stand for maintained prices taken by the tool builders at their meeting in New York a few weeks ago. Such action has not been taken by all builders by any means. It is stated that in the case of the C. & A. list, a large manufacturer cut prices materially by offering to supply all in its line for a lump sum. As a result the C. & A. was able to buy most of the machines it had listed at a figure well within the limits of its appropriation, and have something over with which to buy additional machines.

It hardly need be said that disappointed bidders who made no radical reductions in their prices were much exercised over the transaction. It is understood that the Chicago, Burlington & Quincy has prepared a large list, but is planning to wait until prices harden at a lower level before entering it.

The Allis-Chalmers Mfg. Co., Milwaukee, which has entered the tractor field, has completed purchases of required machinery.

The settlement of war contract claims against the Government continues to move slowly, partly because manufacturers are backward in presenting their claims to the local readjustment board. Civilian members of the board are beginning to feel restive and intimate that unless there is more action they will return to their regular activities.

New bids are to be taken, though no time has been set as yet, on the $100,000 factory, 134 x 400 ft., which is to be erected in Chicago for the Harrington & Kind Perforating Co. The project was first advanced in the latter part of 1917, but did not proceed because of war conditions. The architect is George C. Nimmons & Co., 122 South Michigan Avenue.

Contracts have been placed for a one-story factory 80 x 126 ft., to be built at 2733-2743 South Troy Street for the D. A. Stuart Co., oils, 352 East Illinois Street, Chicago. The cost will be $25,000.

New factories and factory extensions in the territory contiguous to Chicago are few.

The Waterloo Gasoline Engine Co., Waterloo, Iowa, will build a new two-story foundry, 150 x 200 ft.

William Horn, operating a structural iron works at 336-46 North Leavitt Street, Chicago, has commenced the construction of a one-story addition, about 60 x 125 ft., to be used as an assembling shop. The structure is estimated to cost $20,000.

The Joliet Forge Co., Joliet, Ill., will build a one-story addition, 60 x 125 ft., to cost $150,000.

The Steel Fabricating Co., Seventeenth and Center streets, Chicago, is completing plans for the construction of a one-story addition.

The Acme Steel Spring Co., 2337 Keystone Avenue, Chicago, is having plans prepared for extensions and improvements in its six-story plant at 865-69 North Sangamon Street.

The Pan Motor Co., St. Cloud, Minn., is considering the erection of a new one-story foundry, 125 x 175 ft.

The Crown Iron Works Co., Minneapolis, Minn., is planning for the erection of a new one-story foundry on Tyler Street.

The Board of Education, Hawley, Minn., contemplates the construction of a new one-story power plant at the school in District No. 4, to cost about $15,000.

The Minneapolis Steel & Machinery Co., Twenty-ninth and Minnehaha streets, Minneapolis, Minn., is considering the remodeling of its two-story shop, 130 x 430 ft., at Snelling and Thirty-second streets, which has been used for the manufacture of shells. It is understood that the improvements and alterations will provide for the operation of the shop on regular iron and steel manufacture.

Milwaukee

MILWAUKEE, Jan. 27.

An encouraging development of the local machine-tool situation the past week or 10 days is the opening of foreign demand. While export requirements thus far amount to little more than a sprinkling of orders, the large volume of inquiries being received is taken as an indication of a future demand of excellent proportions. Tool manufacturers in general are keeping their facilities fairly well occupied and discern nothing in the immediate situation to indicate that production will not show gradual growth. Domestic buying is confined largely to the automotive industries, but the demand runs into single tools or a few machines at a time, with no lots of any considerable size in prospect. Much effort is being made in reopening the ordinary export business, both as an outlet for existing stocks and future production.

Structural fabricators and erectors report a quiet situation, with orders and contracts of small tonnages for additions and repairs. Several projects requiring large tonnages are in sight, however, which are expected to be undertaken as soon as the situation becomes more settled.

The Wisconsin Shipbuilding & Navigation Corporation, with general offices at 831-833 Merchants & Manufacturers Bank Building, Milwaukee, which was incorporated last May with an authorized capital stock of $5,000,000, expects to start work within a few weeks on the establishment of its proposed new shipyard on Kewaunee harbor, Kewaunee, Wis., which municipality has provided a 40-acre site. The company has revised its plans made necessary by the cessation of hostilities and the return of peace-time conditions, and now proposes to provide facilities to construct six vessels a year of 3500 tons. The design will be standardized and the ships will be suitable for Great Lakes and ocean use. The officers are: President, Paul E. Thomas, president Kempsmith Mfg. Co., Milwaukee; vice-president, Paul H. Kremer, Milwaukee; treasurer, Dr. Arthur J. Puls; temporary secretary, J. W.

Barber; directors, Philip Schwab, president Philip Schwab Co.; Milton C. Potter and Lorenz Frankfurth. William H. Gillen will be general manager. Some of the principal stockholders are Theodore Vilter, president Vilter Mfg. Co.; George P. Gerlinger, president Gerlinger Electric Steel Foundry Co.; John F. Knight, Cleveland, Ohio; H. J. Bawden, New York.

The United States Switch Co., Eau Claire, Wis., originally incorporated with a capital stock of $1,750,000 in Delaware, has reorganized as a Wisconsin corporation with an authorized capital of $300,000, divided equally into preferred and common shares. The change is made to make the organization more compact and the capitalization more commensurate with the actual physical valuation. The company operates a steel and iron foundry and machine shop and in addition to manufacturing automatic switches, signals and other railroad specialties, does commercial engineering and machine work. J. W. Hubbard is president and general manager.

The Conradson Machine Tool Co., Green Bay, Wis., recently incorporated, has acquired 12 acres in Green Bay as a site for its proposed new turret lathe and machine tool appliance plant, to be erected in the spring. Plans are being prepared and details are expected to be ready about the middle of February. The buildings will include a machine shop, experimental shop, drafting room, office and warehouse and shipping building. Later a foundry will be added. The company has a capital stock of $300,000. C. A. Conradson, formerly of Eau Claire, Wis., and widely known as a designer of turret lathes and other tools, is chief engineer and works manager.

The Philip Schwab Co., Milwaukee, expects to break ground the coming week for a new forge works and machine shop to replace the plant recently destroyed by fire. The main shop will be of steel and brick, 50 x 150 ft., part two stories, and will be located on the site of the burned plant. Philip Schwab is president and manager.

The Otto Biefeld Co., Watertown, Wis., founder and machinist, is awarding contracts for the erection of a new foundry unit, 65 x 215 ft., of brick, steel and concrete, costing about $75,000 with complete equipment. The work was planned and projected two years ago, but deferred because of the war. The Biefeld company operates a general boiler and structural works in addition to a machine shop and foundry.

The Reliance Motor Truck Co., Appleton, Wis., at the annual meeting on Jan. 21, made a number of changes in the directorate. Ira L. Miller, founder of the company, retired as president and general manager. John M. Balliet, Appleton, was promoted from vice-president to president and general manager. M. L. Weyenberg was elected vice-president. Other directors are George P. McGillan, E. M. Sweet, A. G. Bruszewitz and George G. Barrow. The company originally was the Racine Motor Truck Co., Racine, Wis. It moved from Racine to Appleton in May last and erected a new plant at a cost of $75,000. This is now being placed in full operation and will manufacture motor trucks and truck axle units.

The H. W. Johns-Manville Co., New York and Milwaukee, is completing final details of its new plant construction scheme at Waukegan, Ill., which will involve an investment of approximately $3,000,000. The works will supplant those on the outskirts of Milwaukee, which are to be abandoned because of changed conditions. The Milwaukee works employ 1100 operatives. The site of the Waukegan plant is on the shore of Lake Michigan and is now being filled in. As soon as this work is finished, construction will begin and hastened to completion. The new plant probably will be a duplicate of the Eastern plant of the company, which was designed by Herman J. Esser, architect and engineer, 402 Camp Building, Milwaukee. It is expected that the same plans will be employed. Charles R. Manville, Milwaukee, is vice-president and general manager of the Milwaukee works and offices.

The Wisconsin Die Casting Co., Milwaukee, has been incorporated with a capital stock of $25,000 to manufacture die castings, dies, etc. The incorporators are Gustav R. Hurz, Julius O. Roehl, attorney, and Fred H. Koch, 501 Frst National Bank Building.

Leenhouts & Guthrie, architects, 424 Jefferson Street, Milwaukee, are preparing plans for a 1-story brick and steel manufacturing building, 100 x 300 ft., to be erected in the spring at Fifty-first and State streets, town of Wauwatosa. The name of the owner and nature of the plant are not divulged.

The Lakeside Paper Co., Menasha, Wis., has plans for additions and new equipment which will cost $80,000. Details will be issued early in February.

The Mitchell Window Device Co., Milwaukee, has been incorporated with a capital stock of $25,000 to manufacture horizontal and vertical pivoted devices for individual and continuous steel and wood sash. The incorporators are Arthur R. Mitchell, Henry F. Nevermann and Edward C. Nevermann.

The A. B. & B. Specialty Co., Milwaukee, has awarded the general contract to Joseph Metz, 1014 Center Street, for the erection of a two-story brick and concrete addition, 55 x 100 ft., to its automobile specialty and sheet metal stamping works at 3300 Fond du Lac Avenue. Charles Stolper, Jr., is president and manager.

The Board of Education, Marshfield, Wis., will call for bids shortly after Feb. 1 for the construction of a two-story reinforced concrete and brick junior high and vocational training school, 50 x 125 ft., costing about $75,000 with equipment. Plans are being completed by Childs & Smith, architects, 64 East Van Buren Street, Chicago. P. J. Kraus is secretary of the board.

The Portage Iron Works, Portage, Wis., will erect a new foundry and machine shop on East Wisconsin Street at an estimated cost of $25,000. A public garage and repair shop will be included as a unit. Andrew Slinger is the principal owner, having purchased the interest of James Baird on Jan. 1.

The Aerial Cutlery Co., Marinette, Wis., has engaged Derrick Hubert, architect, Spies Building, Menominee, Mich., to prepare plans for a two-story factory addition, 30 x 130 ft., estimated to cost $20,000 with equipment. The company manufactures a general line of staple and fancy cutlery. C. F. Jaeger is manager.

The Board of Education, Janesville, Wis., at a special joint meeting with the Common Council and Janesville Chamber of Commerce, voted to build a new high school building, with manual training and domestic science departments, at a cost not to exceed $500,000. An architects' competition to procure plans will be conducted. It is intended to start construction by April 1.

The Northern Corrugating Co., Green Bay, Wis., which was incorporated recently with a capital stock of $200,000 to take over the business of the Fox River Cornice Works, Green Bay, and the Louisville Cornice Works, Louisville, Ky., will build a two-story addition, 50 x 120 ft., to the Green Bay plant, 228 South Washington Street. Contracts will be awarded about Feb. 10 or 15. P. Frank Flagge, Milwaukee, is vice-president and general manager.

R. E. Oberst, architect, 353 National Avenue, Milwaukee, is preparing plans for three additional stories, 48 x 50 ft., to a manufacturing plant on the South Side of Milwaukee. The name of the owner of the plant is withheld for the present.

The Northern Furniture Co., Sheboygan, Wis., has commissioned W. C. Weeks, architect, to design a six-story addition, 50 x 145 ft., of reinforced concrete, steel and brick with mill floors and metal sash, at South Water and North Jersey streets. Two electric elevators and much new woodworking equipment will be installed. Edward Hammett is general manager.

The Hayssen Mfg. Co., Sheboygan, Wis., will ask bids about Feb. 15 for the construction of a $20,000 addition, 50 x 120 ft., of reinforced concrete and brick, designed by W. C. Weeks, architect, Sheboygan. The company makes automatic machinery for wrapping bread and other foodstuffs. Arthur Hayssen is president.

Cincinnati

CINCINNATI, Jan. 27.

Domestic machine-tool business is on the increase, compared with the corresponding week of last month. Orders booked do not call for any large number of machines, but the total received is somewhat encouraging. Automobile manufacturers are buying single tools, but auto-truck makers are slow in placing business. Some machine tool firms are able to run an average force on full time, but most of them are only operating 43½ hrs. per week. In a few cases shops shut down for repairs are still idle and will probably not resume operations on full time until the situation clears up. Work has been suspended on all machine tools for the Government, except in cases where these machines will be needed for regular shop equipment. For instance, a nearby firm has an order for 10 large lathes for the Navy Department. Work on these is going forward without delay, but the large size of the machines makes final deliveries impossible for several months.

A very careful watch is kept on the labor situation, and while more men are being let off from day to day by different industries, most of them are in the unskilled class.

Makers of metal forming machinery are all busy, and have considerable business in sight. Manufacturers of portable electric drilling and grinding machines are also holding their own, but those having export business complain bitterly as to the red tape necessary to send forward

tools to European customers. Jobbing foundries are all operating on short time.

The Lavey Mfg. Corporation, Chattanooga, Tenn., has purchased a number of machine tools from local manufacturers that will be needed in fitting up two plants recently acquired by the company. In the list of equipment wanted, and not yet purchased, is one 6-ft. radial drilling machine and one 24-in. to 30-in. gear cutting machine. H. S. Charnell is purchasing agent.

The Cisco Machine Tool Co., Cincinnati, has increased its capital stock from $100,000 to $150,000 to take care of its expanding business. The company recently completed an extensive addition to its plant in West End. G. M. Horton is general manager.

It has been definitely announced that the Long & Allstatter Co., Hamilton Ohio, has taken over the former plant of the Buckeye Marble Co., which will be used for the manufacture of agricultural implements. The company formerly made a specialty of this business but had neglected it for some time to take care of its fast increasing demand for large punching and shearing machines.

The Hamilton Metal Products Co., Hamilton, Ohio, has been incorporated with $30,000 capital stock, and has absorbed the Hamilton Sheet Metal Co. and the Schlichter Mfg. Co. It will engage chiefly in the manufacture of metal products, and will also make hardware specialties.

The J. A. Reid Co., Dayton, Ohio, whose incorporation was recently noted, will make a specialty of grain hullers and scouring machines for flour mills. Other specialties will also be manufactured. It has acquired a building at Pine and Shawnee streets.

The Martin Steel Products Co., Mansfield, Ohio, has been incorporated with $150,000 capital stock by William Martin and others. Nothing has yet been given out as to manufacturing plans.

The Ortman Motor Co., Washington Courthouse, Ohio, has increased its capital stock from $50,000 to $100,000.

It is rumored that the Haskins Glass Co.'s plant at Martin's Ferry, Ohio, will be rebuilt at an early date.

It is reported that the Mid-West Engine Co., Indianapolis, Ind., has plans under way for an extension to its plant at Anderson, Ind. Details are not yet available.

The Lack Mfg. Co., Paducah, Ky., is installing machinery in a plant that will be used for making a new type of internal combustion engine.

Cleveland

CLEVELAND, Jan. 27.

Interest in the machine-tool trade is centered in the requirements of the General Motors Corporation which in carrying out its plans to make important changes in its production methods by centralizing the manufacturing of various automobile parts in different units is arranging to purchase a large amount of machinery before July. This buying has already started in the plant of the Chevrolet Motor Car Co. A fair volume of business is coming from automobile manufacturers and makers of automobile parts in the Michigan section, several orders for from 2 to 6 machines having been placed the past week. Generally the outlook is better. The trade feels encouraged in the report that the supply of machine tools to be sold by the Government will be much less than originally estimated and some machinery men express the opinion that under normal conditions this machinery would be absorbed by the trade without becoming a disturbing factor.

A great deal of used machinery is being offered by manufacturers who have been using it for Government work, but a large portion is being held at prices higher than dealers are willing to pay. Some dealers are offering no higher prices for this machinery than they would were manufacturers prices for the new machines the same as at the normal level of the pre-war period. Machine-tool manufacturers generally continue to adhere to prices that have been prevailing recently.

The Pennsylvania Lines West through the purchasing department in Pittsburgh have received proposals for the following equipment for the Columbus shops: One 6-ft. heavy duty plain radial drill; one 24-in. slotting machine with double head frame; two 18-in slotting machines, one 20-in. x 7 ft. one 26-in. x 6 ft.; two 20-in. x 10 ft. and two 20-in. x 8 ft. heavy duty engine lathes; one 42-in. vertical turret lathe; one No. 5 plain milling machine, and one 20-in. high-speed adjustable feed vertical drilling machine; all to be motor driven.

The Torbensen Axle Co., Cleveland, which recently placed contracts for an extension, expects to purchase about $30,000 of new machine-tool equipment.

The Cleveland Implement Mfg. Co., Cleveland, has been organized with a capital stock of $500,000 and contemplates establishing a plant in Alliance, Ohio, for the manufacture of machinery for planting and digging potatoes. Later other small farm tools are to be added to the product. F. D. Moody is president and general manager; George H. Burrows, vice-president, and C. F. Young, secretary and treasurer.

The Electrical Mfg. Co., Cleveland, has purchased two factory buildings and a 5-acre site formerly occupied by the plant of the Ri-Chard Auto Mfg. Co., which went into the hands of receivers some time ago.

The Glass Coating Co., Cleveland, which has recently placed a contract for a new factory, is placing orders for bending rolls and other plate working machinery. It is also in the market for three electric traveling cranes.

The Bissinger Magneto Co., 1613 Schofield Building, Cleveland, has had plans prepared for a two-story factory, 40 x 135 ft., to be erected at 1729 East Twenty-first Street.

The controlling interest of the Lewis Steel Products Co., Toledo, has been purchased by Detroit and Cleveland men who are interested in the manufacture of automobile parts. It is stated that the plant will be enlarged and later a new one will be erected. George H. Lewis, president and founder of the company, has disposed of his interest and A. R. Clas, formerly of the Falls Motor Corporation, Sheboygan, Wis., has been made manager. The company manufactures valves for automobile, tractor and other types of motors.

The Lober Radiator & Mfg. Co., Toledo, Ohio, has been incorporated with a capital stock of $50,000 and will take over the Lober Art Brass & Specialty Co., 128 Eleventh Street, which it plans to enlarge. The company has been making airplane radiators but will now make radiators for the commercial trade.

The K. & Z. Automatic Screw Co., Defiance, Ohio, has completed its organization by the election of C. W. Zellers president; L. J. Kahlo, vice-president, and F. S. Davis, secretary and treasurer.

The New Tread Tire Co., Columbiana, Ohio, has been incorporated with a capital stock of $100,000 by E. P. Altenburg and others, and has acquired a factory building which it is equipping for retreading old automobile tires.

The Hoover Suction Sweeper Co., North Canton, Ohio, has taken over the adjoining plant of the W. H. Hoover Co., manufacturer of leather goods, and the line of leather products will be discontinued. The Suction Sweeper Co. will use the additional capacity to manufacture a portion of the motors used in its sweepers, but it is the intention to enlarge the plant later and make all the motors that are required. Additional foundry equipment is being installed.

The Rowland-Price Steel & Iron Co., Cambridge, Ohio, recently incorporated with a capital stock of $50,000, has purchased a building and plans to install equipment and place it in operation as soon as possible. It will engage in the repairing of steam shovels, but later expects to manufacture them.

The Columbus Structural Steel Co., Columbus, Ohio, has recently completed an addition to its plant, 130 x 180 ft., which is now in use. It is in the market for a 48-in. gate shear, multiple punch for plate and angle work, planer, shaper, lathes, drop hammer for forgings and air compressor. H. E. Kunzman is general manager.

Detroit

DETROIT, Jan. 27.

With $300,000,000 in war contracts canceled and practically no adjustment made, manufacturers are being forced to shut down because of lack of capital. As the result, unemployment in this city is approaching the 50,000 mark. Similar conditions exist throughout the State. In Detroit definite plans for industrial building totaling several million dollars have been delayed by the Government's inaction.

As soon as an adjustment of war contracts is effected a period of industrial prosperity is anticipated. Automobile concerns report more orders than they can fill, which is true of accessory and other manufacturing lines.

Machine tool jobbers, who confidently expected a record-breaking business in February, state that there is little chance of a great increase in demand before March or April. Meanwhile the market is below normal.

The United Steel & Wire Co., Battle Creek, Mich., has increased its capital stock from $100,000 to $200,000 and will double the capacity of its plant by the construction of an additional main building, 100 x 200 ft.; dipping plant, 32 x 40 ft.; extension to the warehouse, 40 x 100 ft., and a shipping shed, 20 x 80 ft. The company started in 1909 with three shopworkers. Recently a tract of 60,000 sq. ft. was purchased to enlarge the factory.

The Rich Steel Products Co., Battle Creek, Mich., has planned to increase its output and will enlarge its plant. An effort is being made to get more workers.

About Feb. 10 the Galesburg Casting Co. will locate in Battle Creek, Mich., and will be known thereafter as the Battle Creek Casting Co. Frank Scott and E. W. Cole, Battle Creek, are principally interested in the concern. The units of the plant are being erected and consist of a gray iron foundry, 200 x 33 ft.; smelting room, 38 x 16 ft., and fireproof pattern room, 30 x 50 ft. A brass foundry will be erected later.

The plant of the Peck Iron & Steel Co., Kalamazoo, Mich., builder of foundry equipment, was wrecked by an explosion and will have to be almost entirely rebuilt. Machinery in the shop of Armstrong & Veley was also badly damaged.

The Bollstrom Motors Co., St. Louis, Mich., will erect a building to manufacture a new type of four wheel-drive trucks. It is estimated that when the plant is in full operation it will employ a force of about 2500.

The Michigan Stamping Co., Detroit, is inquiring for a large toggle press 180 in. between housings.

The Automatic Screw Machine Co., Detroit, is considering the erection of a one-story addition to its works on Williams Street.

The Michigan Chandelier Co., 716 Erskine Avenue, Detroit, is planning for the construction of a one-story addition, 30 x 50 ft.

The J. W. Murray Mfg. Co., 571 Clay Avenue, Detroit, Mich., manufacturer of auto parts, has broken ground for the erection of a two-story addition, 60 x 100 ft., at 550 Clay Street, to cost $25,000.

St. Louis

ST. LOUIS, Jan. 27.

The Chandeysson Electric Mfg. Co., St. Louis, whose product has been manufactured by the Pan Electric Mfg. Co., under license, is completing factory buildings which will be equipped for producing dynamos and motors. The equipment will include many motor driven machine tools, direct connected.

A. Bernstein, Albany, Ala., is reported in the market for about $10,000 worth of cotton gin machinery to replace equipment burned.

The Meridian Veneer Co., Meridian, Miss., A. D. Watson, president and manager, is in the market for about $30,000 worth of equipment.

G. A. Smith, water superintendent, Benton, Ark., has acquired the local electric plant and will install an engine, 125 kw. generator and other machinery.

The Climber Motor Co., H. F. Bohler general sales manager, will equip a plant to manufacture and assemble automobiles.

The Arkansas Truck & Motor Co., with a capital stock of $300,000, will equip a plant. J. B. Sedberry is president and H. M. Barney secretary and manager.

The Kant Break Spark Plug Co., St. Louis, will equip a $30,000 plant for the manufacture of spark plugs.

The Nomus Mfg. Co., St. Louis, W. J. Miller, L. B. Hornell and others, will equip a $30,000 plant for the manufacture of metal ice cream freezers.

The Little Rock Battery Co., Little Rock, Ark., has increased its capital and will install about $25,000 worth of additional equipment for the manufacture of batteries.

The Cane Creek Petroleum Co., Muskogee, Okla., will equip pumping stations with a daily capacity of 1,000,000 cu. ft.

The Warren Steel Casting Co. will equip a machine shop, install electric motor equipment and add other machinery not now operated.

The Harrisburg Gin & Mill Co., Harrisburg, Ark., is reported in the market for about $25,000 worth of ginning and other machinery.

Natchez, Miss., plans the equipment of an electric light plant and has engaged an engineer, under the direction of the mayor, to prepare plans.

A. B. Tissington and others of Muskogee, Okla., will equip a cotton compress of 20,000 bales capacity, to cost about $250,000.

The Dixie Battery & Mfg. Co., Pine Bluff, Ark., has been incorporated with a capital of $12,000 to manufacture electric batteries. Leo C. Graham, H. A. Irish and Arthur Graham are the incorporators.

California

LOS ANGELES, Jan. 21.

The Sadler Auto Support Co., Los Angeles, has been incorporated with a capital of $15,000 to manufacture automobile parts and specialties. Edwin H. Sadler and Ernest L. Hall, Huntington Park; and Alfred Easter, Los Angeles, are the incorporators.

The Lisenby Mfg. Co., Fresno, manufacturer of printing presses, etc., is planning for the erection of a new plant in the vicinity of its present works for the manufacture of tractors and agricultural machinery. Carl Lisenby is president.

The Paulsen Platform Tractor Co., Los Angeles, has been incorporated with a capital of $500,000 to manufacture tractors, engines, etc. Thomas R. Paulsen, J. W. and H. T. Johnson, and S. S. Latz, all of Modesto, are the incorporators.

The Board of Education, Santa Barbara, Cal., has rejected all bids recently received for the construction of a mechanical and machinery building for the new manual training school on the Jefferson school grounds, and will call for new bids at an early date. The structure will include machine shop, metal-working shop and other departments.

Ayer & Bennett, Los Angeles, representing the Ohio Mfg. Co., Upper Sandusky, Ohio, manufacturer of tractors and other agricultural equipment, are considering the establishment of a plant at Bakersfield, Cal., to be equipped for tractor assembling work.

The Terminal Market Battery Co., 761-63 Central Avenue, Los Angeles, has been organized to manufacture batteries, etc. Roderick N. Harvey, 1116 East Eighth Street, heads the company.

Three electrically operated pumping plants on the Sacramento River are planned by the Alameda Sugar Co. and the Alameda Farms Co., Alameda. Application has been made to the State Water Commission for permission to build the plants, which are estimated to cost about $275,000.

The Board of Trustees, Calexico, Cal., is considering the construction of a municipal electric power plant. It is planned to make immediate estimates.

The Salsini Packing Co., San Jose, Cal., is contemplating the erection of a complete new unit at its packing plant, including machinery and equipment, electric motors, etc., to double the present output. It will be of reinforced concrete, two-stories, 60 x 600 ft., and is estimated to cost about $100,000.

Canada

TORONTO, Jan. 27.

The William Kennedy & Sons, Ltd., Owen Sound, Ont., in conjunction with other interests, recently took over the plant of the Owen Sound Iron Works, where it is manufacturing ship machinery, boilers, cement and sawmill machinery. The company recently erected an addition, 46 x 200 ft., which will be equipped with two cupolas for melting iron, heavy traveling crane, boring and planing machinery, etc.

The Hayes Wheel Co. of Canada, Ltd., Chatham, Ont., has closed contracts for the manufacture of front axles for automobiles and will carry on the business in the plant formerly used for the manufacture of munitions. It expects to begin operations by March 1.

The Nineteen Hundred Washer Co., 489 King Street West, Toronto, is in the market for a 4-spindle drill, with power feed; one surfacing machine, 18-in. disc, and one 26-in. power feed drill.

The Kipawa Co., Ltd., Montreal, has been incorporated with a capital stock of $20,000,000 by Gordon W. MacDougall, Lawrence Macfarlane, William B. Scott and others. It is the intention to commence at an early date the erection of pulp and paper mills to cost upward of $5,000,000, at Temiskaming, Que. G. J. Lamb is engineer.

John E. Riddell & Son, Ltd., Hamilton, Ont., has been incorporated with a capital stock of $100,000 by John E. Riddell, James Chisholm, Thomas B. McQuesten and others. The company will take over the business now carried on by John E. Riddell & Son, to manufacture sheet metals, iron, steel, etc.

The Canadian Cartridge Co., Ltd., Hamilton, Ont., which has been engaged in the manufacture of munitions, etc., is equipping its plant to manufacture steel barrels, etc.

The Lyall Shipbuilding Co. and the Pacific Dredging Co. are preparing plans for the construction of a drydock at Vancouver, B. C., to cost $3,000,000.

The city of Saskatoon, Sask., will build an addition to its electric light plant to cost $25,000 and is in the market for a 2200-hp. turbine, 2200 volts, direct drive. Andrew Leslie is clerk.

The machine shop owned by the Canada Steamship Lines, Ltd., foot of James Street, Hamilton, Ont., was destroyed by fire with a loss of $13,000.

The Dominion Shipbuilding Co., foot of Bathurst Street, Toronto, will build a boiler house and other extensions.

E. A. Lowry, Guelph, Ont., is in the market for a vertical boring mill, 48 or 52 in., new or second hand.

The International Harvester Co. of Canada, Ltd., Hamilton, Ont., has purchased the Oliver interests in the Oliver Chilled Plow Works of Canada, Ltd., located at Hamilton, Ont. The name of the company will be changed. The Harvester company assumes immediate control and operation of the property. This is the short official statement made by A. C. Dann, general superintendent of the Oliver company, and is a follow-up of the statement made a few weeks ago by H. H. Biggert, manager of the International Harvester Co., to the effect that the company contemplated expansion by manufacturing new lines of agricultural implements in anticipation of an increased demand both for home consumption and export. The two companies have had friendly working relations in the past, and not being competitors, the International Harvester Co. marketed the products of the Oliver company, and thus made a selling staff unnecessary for the latter company. The plants of the two companies are side by side on the water front, and no doubt there will be a saving in the matter of executive officers. The plant of the Oliver company is recognized as one of the most modern in the country. Plows only are manufactured. In the Harvester plant practically every large farm implement except plows are made, including tractor engines and motor trucks.

The Nashwaak Pulp & Paper Co., Marysville, N. B., plans a pulp mill to cost $400,000. N. M. Jones is manager.

The Duffy Blinn Co., Saulnierville, N. S., will start work on the erection of a shipbuilding plant.

The Canadian Milk Products, Ltd., Dundas Street West, Toronto, plans the erection of a machine shop.

The Canada Metal Co., Fraser Avenue, Toronto, will erect a one-story addition to cost $4,500. F. S. Mallory, 65 Adelaide Street East, is architect.

Plans have been prepared for the erection of a shipyard at Victoria, B. C., for the Foundation Co., Ltd. Bayley Hipkins is manager.

Plans have been prepared for a floating drydock and shipbuilding plant at Victoria, B. C., for the Watson Dry Dock & Construction Co. George Watson is general manager.

Sam Chevrier, Gravelbourg, Sask., proposes to install an electric light plant at a cost of $50,000.

The work shops of the Cadillac Motors, Ltd., at Park Avenue and Sherbrooke Street, Montreal, were destroyed by fire Jan. 12, with a loss of $500,000.

The plant of Jennings & Co., 15 Wellington Street, Montreal, manufacturers of motor cars, etc., was destroyed by fire Jan. 12, with a loss of about $1,000,000.

The Sarnia Fence Co., Ltd., Sarnia, Ont., manufacturer of farm fencing, has been sold by its present owners, M. D. and M. H. Pendergast to H. Banwell and William Lottridge of the Banwell-Hoxie Wire Fence Co., Hamilton, Ont., and James Playfair of the Great Lakes Transportation Co. Mr. Lottridge will be manager. Messrs. Pendergast will devote themselves to their two fence plants in the United States.

The Pacific Northwest

SEATTLE, Jan. 21

Every line of industry in the Northwest is showing more or less hesitation in undertaking expansion and making definite plans for the year. It is generally believed that this period of uncertainty will be short-lived and that conditions will soon be on a permanent basis. Labor unrest, particularly in shipyards and allied industries, continues an extremely serious problem.

Many small plants which were largely dependent upon wooden shipbuilding and allied interests for a part of their business, are busy finding new markets for their products, or in finding a new product which can be turned out of their plants with as little readjustment as possible.

General business conditions indicate that the period of readjustment will be slow, and although no extreme depression is expected, buying in all lines will undoubtedly be quiet. Demand for tools shows a very slight increase and the market is very dull. Cessation of activities at the Government spruce plants, and the dismantling of all sawmills and cut-up plants operated by the Government will throw a large amount of practically new equipment on the market.

The Watson Drydock & Construction Co., Ltd., Victoria, B. C., has been organized for $100,000 to construct and equip a floating drydock to repair vessels up to 300 tons, and will also equip a plant for building tugs, scows, and other small boats.

The Pacific Foundry Co., Tacoma, was recently incorporated for $10,000 by Edward Simpson and F. J. Walsh.

The Pacific Car & Foundry Co., Renton, Wash., whose plant has been closed since last November by a strike, has resumed activities, and is working on the construction of 2000 freight cars for the Federal Railroad Administration, representing a contract of $6,500,000. They are of partial steel construction.

NEW LINES OF MANUFACTURE

Metal Working Companies Plan to Utilize Added Capacity

Representative manufacturers of machinery and other iron and steel products have made the following appraisements of the immediate future of business, supplementing similar digests which appeared in THE IRON AGE of Jan. 2 and 16:

Brewer-Titchener Corporation, Crandal Stone Division, Binghamton, N. Y.—Automobile and Carriage Hardware.—We are now swinging back to regular lines, which cover automobile parts or accessories, and intend to turn out certain new lines in increased quantity to occupy our entire capacity. We did not make any increases in buildings during the war period, although we had made certain increases just prior to the time the United States entered into war. All of these buildings will be utilized. We purchased some additional equipment, nearly all of which will be utilized. We now expect to add further to our equipment in certain lines, and we believe by Feb. 1 we will be 100 per cent on peace schedule.

Barcalo Mfg. Co., Buffalo, N. Y.—Wrenches, Tool Grinders, etc.—We will go back to our formal lines and add one or two new lines. Not all of our increases in equipment will be utilized under peace conditions. It will take us about four months to reach 100 per cent peace schedule. We look for a reasonably good demand for our products during the coming months. The possibility of developing an export business is fair. The methods to be used are a combination of personal representation and through commission houses located in New York.

Brown Instrument Co., Philadelphia—Indicating and Recording Instruments.—Plant will go back to its former line and new lines are contemplated to occupy extra capacity, but it will take some time to readjust. At the present time there is quite a falling off in orders generally, and until this condition changes our plant will hardly be utilized to its maximum. Probable demand will depend entirely on business conditions and how soon business resumes full swing again. We are going energetically after export business and hope to secure our full share.

Covington Machine Co., Covington, Va.—Punches, Shears, Rolls, Coke and Coal Machinery.—Railways and some other lines should require our punch and shear machinery, and our coke machinery line will still require repairs, but few new machines. We probably will do less tonnage in 1919, and it will market for less money, and, no doubt, at less margin.

Luster-Jordan Co., Norristown, Pa.—Wood Box Machinery, Special Machinery, Tools, Jigs, Fixtures, etc.—For the past year we have been working on Government work. In fact, we were forced to discontinue some of our side lines, as our entire force was necessary to get out the box-making machinery for the manufacture of ammunition boxes, shell, and chemical boxes. We are now turning over to our former lines, and are also planning new lines to utilize our extra equipment and organization.

NEW TRADE PUBLICATIONS

Steel Buildings.—Milliken Brothers Mfg. Co., Woolworth Building, New York. Booklet. Devoted to the standardized truss unit system for industrial and other buildings. The trusses and columns of the system, it is explained, are composed of a series of triangular units, capable of being quickly coupled together in different forms to make up a complete steel skeleton frame structure, ready for the application of siding and roofing material of such character as may be desired. Views of typical buildings and various building cross sections are shown.

Grinding, Pulverizing and Separating Machinery.—Raymond Brothers Impact Pulverizer Co., Chicago. Catalog No. 13. Describes a line of grinding, pulverizing, and air separating machinery. Numerous pulverizing problems are discussed and views of the firm's apparatus installed for specific purposes are given.

Automatic Telephone.—Screw Machine Products Corporation, Providence, R. I. Booklet. Describes the Select-O-Phone system which is a combined automatic intercommunicating telephone service and a general or factory call system. It consists of an automatic switchboard and regular telephone instruments for transmitting and receiving. The call system is not necessarily applied to the main system, but may be installed when desired. The Select-O-Phone has an ultimate capacity of 28 lines with automatic ringing and 83 lines with button ringing. The operation of the system is described and illustrations and descriptions of the apparatus are given.

Metal Tanks.—C. C. Fouts Co., Middletown, Ohio. Catalog. Lists and describes a line of "Duro" and "Century" knockdown iron tanks.

Wood Factory Buildings.—Austin Co., Cleveland. Pamphlet. Illustrates a series of designs for wood construction covering the 10 Austin standard types. Specifications and elevation drawings of the different types are given. The features of unobstructed working space, overhead clearance, ventilation and lighting of the original steel construction are retained in the new wood standards.

Magnetic Separators.—J. W. Paxson Co., 1021 North Delaware Avenue, Philadelphia. Bulletin No. 33. Lists and illustrates a line of belt or hand power machines for removing iron and steel trimmings, filings, etc., from glass, emery, rubber, ores and other material.

Electric Heating Devices.—American Electrical Heater Co., Detroit, Mich. Folder. Illustration of sixteen different applications of electric devices for soldering iron, melting glue, etc.

Turbo Blowers.—Coppus Engineering & Equipment Co., Worcester, Mass. Catalog. Devoted to a line of turbo blowers for undergrate draft and other industrial purposes. Forced draft versus induced draft and the principles of the blowers are discussed. A detailed description of the blowers is given and their advantages are pointed out. The catalog is illustrated with assembled and detail views of the blowers.

Metal Lath.—General Fireproofing Co., Youngstown, Ohio. Booklet. Describes and illustrates herringbone rigid metal lath and its applications by diagram and photographs. Its use in the construction of suspended ceilings of various types, partitions and side exterior construction over brick or tile are shown. Tables of gages and weights are also supplied.

Overhead Carrying Devices.—New Jersey Foundry & Machine Co., 90 West Street, New York. Catalog No. 99. Describes and illustrates various types of cranes, grapples, hoists, trolleys and tracks, buckets, I-beam clamps, tongs, T-rails, switches, turntables, wheels and washers. Tables of sizes, capacities, maximum dimensions and weights and maximum loads and spacing are given, with additional standard illustrations and diagrams of installations.

Steel Shelving and Bins.—C. C. Fouts Co., Middletown, Ohio. Catalog. Devoted to a "Unit System" of shelving, racks and bins, made of steel. The chief advantage claimed is quickness and convenience in erection, taking down, moving and re-erecting. A number of drawings and illustrations of the shelvings are given.

Grinding Machine.—Thompson Grinder Co., Springfield, Ohio. Bulletin No. 12. Describes a 10 x 36 in. "Universal" grinding machine. Numerous illustrations showing the application of the grinder are included.

Steel Shop and Tote Boxes.—Allsteelequip Co., Aurora, Ill. Folder. Describes a line of steel shop and tote boxes, stacking boxes, taper pans, handles and label holders. These boxes are made in standard styles and in sizes as specified.

Portable Elevator.—Revolvator Co., 336-352 Garfield Avenue, Jersey City, N. J. Folder. Describes a portable hoisting machine, built in sizes from 6 to 20 ft. in height and for 800 lb., 1200 lb., and heavier capacities as required. Illustrations showing various applications of the revolvator are included.

Gears.—Philadelphia Gear Works, 1120 Vine Street, Philadelphia. Catalog. Devoted to an extensive line of spur, bevel, and spiral gears that can be supplied in steel, brass, iron and rawhide; also a line of chains and sprockets. The various types of gears are illustrated and tables of the sizes that can be supplied are included.

Storage Hopper.—Green Engineering Co., East Chicago, Ind. Catalog. Describes and illustrates a materials transfer and storage hopper. A feature pointed out that is conducive to longer life, is the construction of all surfaces of cast iron that are subjected to the rusting and abrasive action of the stored materials. Quick erection with unskilled labor is claimed.

Fuel Oil Engine.—Chicago Pneumatic Tool Co., Chicago. Bulletin 34-W. Concerned with a semi-Diesel fuel oil engine. The horizontal position of the engine, the use of a crosshead and of a hot plate instead of a hot ball or electric ignition are the features pointed out. The principles of operation are completely described and numerous views of the engine and component parts are included.

Machine Bronze.—Lumen Bearing Co., Buffalo. Folder. Concerned with a stock of solid and cored bars of machine bronze for automobile and machinery construction and repair. A table of the various sizes in stock is given.

Oil.—Dearborn Chemical Co., Chicago. Booklet. Devoted principally to a description of the company's products for the prevention of rusting or corrosion of iron and steel. Illustrations, tending to show the merits of the compound, are included. A number of pages are devoted to the company's cutting, quenching and drawing oils.

Small Tools.—Cleveland Punch and Shear Works Co., Cleveland. Catalog No. 6. Describes and illustrates a line of cold cutters, coupling nuts, cutting edges, dies, markers, pins, pistons, punches and rivet sets.

Conveyors.—John F. Godfrey, Elkhart, Ind. Describes a single bucket conveying system for the handling of coal, ashes, ore, etc. Views of a number of conveyor installations are included.

Concrete Floors.—Concrete Hardening Co., 220 Fifth Avenue, New York. Folder. Concerned with a liquid chemical concrete hardener for wearproofing and dustproofing concrete floors.

Auto-Crane.—John F. Byers Machine Co., Ravenna, Ohio. Bulletin 1015. Deals with the company's auto-crane, Model 3, intended for contracting and general construction service. Numerous illustrations showing the adaptability of the crane to various types of work are given.

Milling Machines and Grinders.—Oesterlein Machine Co., Cincinnati. Catalogue. Illustrates and gives specifications for various types of plain and universal milling machines, cutters and tool grinders, together with specifications for handling different operations. The accompanying text explains the operations and care of the apparatus. Tool room grinders for best results are also discussed.

Bucket Elevators.—Jeffrey Mfg. Co., Columbus, Ohio. Catalogue No. 244. Devoted to details of bucket elevators selected out of numerous styles used in the handling of a wide range of materials, such as coal, ashes, stone, grains, cement, etc. The capacity of the elevators range from 6½ to 80 tons per hour. The size of material may vary from dust to 4½-in. cubes. A page is given to each standard elevator, which is illustrated both in perspective and in line drawing. A view of the chain and bucket used in each type is included.

Coal Mine Conveyor Equipment.—Link Belt Co., Thirty-ninth Street and Third Avenue, Chicago. Bulletin No. 333. Gives a description with illustrations of the company's line of coal mine equipment, including coal tipples and retarding conveyors. Views of individual parts of the system as well as numerous complete installations are shown.

Calendar.—Brown Hoisting Machinery Co., Cleveland, Ohio. Size 12½ by 19 in. There are 12 cardboard sheets of the dimensions given, each with the illustration of a different type of crane manufactured by this company. The background of the calendar is black, with the numerals and lettering in white.

Corrugated Culverts.—C. C. Fouts Co. Middletown, Ohio. Folder. Describes and illustrates "Duro" portable corrugated iron culverts. The advantages claimed are compactness in shipping and ease of assembly.

Safety and Economy in the Boiler Room

(*Continued from page 307*)

before it is fired on chain grates, and this is the moisture I refer to particularly. We have made tests which show that dampening fine slack fires on chain grates, so that the total moisture content was from 5 to 8 per cent, improved the efficiency and capacity as compared to firing the slack dry, but the great trouble with this is, that too much water is likely to be put on. I have seen the coal literally soaked, so that the moisture which it contained ran from 16 to 20 per cent, and this is wasteful. Adding water to coal would seem to be providing a means for carrying away heat uselessly. However, a small quantity seems, at least with some coal, to improve combustion and prevents clinkers. When water is used at all, however, it should be in such a way that the coal can't be soaked.

The incomplete combustion loss is due to firing too much coal at one time, too thick a fire; clinkering coal and insufficient combustion space and temperature. Firing too much coal at one time is a practice that must be dealt with mainly with hand-fired boilers. Any good mechanical device used for firing feeds the coal gradually and continuously to the fire, something which it is almost impossible to make a fireman do. I do not know of any way to determine the proper thickness of fire for a given hand-fired grate or stoker, with the draft available, other than to run tests with different thicknesses and analyze the waste gas.

Clinkering coal causes incomplete combustion, by the ash in the coal melting and forming a thin layer on top of the grate bars. A condition the inexperienced firemen attempt to relieve by free use of the slice bar. When using coal with an ash of this kind fired on flat grates by hand, the less disturbance of the fire the better. As soon as the grates begin to cover over, the fire must be burned down as well as possible and then cleaned. There is no use trying to keep the grates open by using the slice bar, as it only makes a bad condition worse. Such clinkering coal can usually be burned successfully on chain grates by running a thin fire and letting the fire alone, cleaning any clinker which does form off the grate as it comes around.

Heat Losses in the Ash Pit

The loss in the ash pit must be dealt with in different ways, depending upon the type of equipment used. With hand-fired grates, about all that can be done is to have the air spaces in the grates as small as is consistent with proper air supply. I like best the herring-bone bar, with the air spaces not over ½-in. or ⅝-in. wide. With flat grates the most of the unburned coal falls through near the front end, where it is often possible to scrape out some of this before the fires are cleaned, and fire it over again. With chain grates it is usual to extend the floor of the boiler room back under the grate about two-thirds its length or put in reclaiming pans extending back this distance. The unburned coal that falls through on this can be raked forward and refired. All the coal that is not burned when it reaches the back end of a chain grate is dropped over with the ashes and cannot be reclaimed and for this reason it is important to have coal used on chain grates crushed fine.

It may not be amiss to say a word in regard to sampling the contents of the ash pit for analysis, to learn what the loss actually is. It is not possible to get a fair sample of a large quantity of mixed ashes and clinker. What I like to have done is, to have all the clinkers of any size picked out with a hook and weighed separately. This is incombustible and does not need to be sampled. The remaining ashes, which will be mostly fine and easily handled, can be weighed and then sampled in the regular way. The combustible part which this contains can then be determined as a percentage of the total contents of the ash pit.

The loss of heat to surrounding air does not need any very extensive discussion, as the proper remedy is apparent. This, of course, is to cover every part of the surface of the boiler, piping valves, etc., with a good thick non-conductor. The use of insulating brick, as one vertical course inside the boiler wall which surrounds the hottest part of the furnace and boiler, would, I believe, be warranted by the heat saving which will result.

Training the Men

Having discussed the various heat losses which take place in operating boilers, it remains to discuss the application of this in the training of the boiler house foreman and fireman. I believe the best way to begin this training is to prepare a typewritten or printed manual of instructions. An engineer or other mechanical man familiar with the subject must take up with the boiler house foreman these instructions in detail, explaining to him the points which he does not understand.

After the foreman has received such preliminary training the next step is to teach him more in detail about the proper handling of the fires, so that he will be properly equipped to instruct the fireman verbally and by actual example. I believe one good method to follow is to equip one boiler in the plant completely with recording instruments, and teach him the use of these instruments for the purpose of controlling the fire and the boiler. After the boiler house foreman has a good working knowledge of the curves drawn by the recording instruments, he should be required to rotate the firemen, so that the boiler equipped with the instruments will be under the charge of each fireman successively, for several days or a week at a time. As each man has charge of the boiler he must be shown the effect of the different operating conditions as indicated by the curves from the instruments, as he thus gets at least a fair idea of what he is required to do in order to keep down the waste of heat.

The kind of instruments referred to include a steam meter, recording pyrometer, draft gauge and CO_2 recorder. Such instruments are of use only when they are kept in a fairly accurate condition and the information which they give, actually used in handling the fires.

Comfort and Convenience

Next in importance to better provision for safety and proper systematic training of the operating men, are good working conditions. The boiler house ought to be made as comfortable as it is possible to make a place of this kind. There should be good light, both day and night, good ventilation and some attention should be given to keeping it warm and free from draughts in the winter. It may seem an anomalous condition to speak about warming a boiler house, but as an actual fact, many times boiler houses are cold and draughty when the weather is cold.

It is necessary to make such provision for convenience that the work which the men do will be done as easily as possible; otherwise they will slight, as much as they can. For instance, furnace doors which have to be opened at intervals for firing or to inspect the condition of the fires, should have wooden handles, and if these are not possible, the metal handles should be wrapped with wire woven asbestos sheet, or other non-conductor. If it is not possible to inspect the fire through the doors, small inspection windows should be put in, made by running 2-in. pipe through the wall, with a glass window in its outer end. A piece of blue-glass 4-in. or 5-in. long by 1½-in. wide, set in a frame with a handle on it, in the hands of each foreman, or a number of pairs of blue glasses distributed where they will do the most good, are, in my opinion, mighty good aids in handling the fires. The right kind of firing tools are also most necessary. I have often seen firemen try to do their work with tools which were entirely unsuited for the purpose. Possibly the handles were too long, where the space is limited, and the handles were made of solid iron rods of ¾-in. or 1-in diam. where light pipe would serve every purpose. Such things may seem like petty details, but I have seen so much wasted energy, due to lack of attention to these very things, that I know their importance is not always appreciated.

Current Metal Prices

On Small Lots, from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general headings of "Iron and Steel Markets" and "Metal Markets."

Iron and Soft Steel Bars and Shapes

	Per lb.
Bars:	
Merchant iron, base price	4.57c
Refined iron, base price	5.32c
Burden's H. B. & S. bar iron, base price	6.30c
Burden's best bar iron, base price	6.50c
Norway bars, base price	20.00c
Soft Steel:	
¾ to 17/8 in., round and square	3.97c
1 to 6 in. x ⅜ to 1 in.	3.97c
1 to 6 in. x ¼ and 5/16	4.07c
Rods—⅝ and 11/16	4.02c
Bands—1½ to 6 x 3/16 to No. 8	4.57c
Shapes:	
Beams and channels—3 to 15 in.	4.07c
Angles:	
3 in. x ¼ in. and larger	4.07c
3 in. x 3/16 and ⅛ in.	4.32c
1½ to 2½ in. x ⅛ in.	4.32c
1½ to 2¾ in. x 3/16 in. and thicker	4.07c
1 to 1¼ in. x 3/16 in.	4.12c
1 to 1¼ in. x ⅛ in.	4.17c
⅞ x ⅞ x ⅛ in.	4.22c
¾ x ⅛ in.	4.27c
⅝ x ⅛ in.	5.07c
½ x 3/32 in.	5.77c
Tees:	
1 x ⅛ in.	4.47c
1¼ in. x 1¼ in. x 3/16 in.	4.37c
1½ to 2½ x ¼ in.	4.17c
1½ to 2½ x 3/16 in.	4.17c
3 in. and larger	4.12c

Merchant Steel

	Per lb.
Bessemer machinery	3.97c
Tire, 1½ x ½ in. and larger	3.97c
Toe calk, ½ x ⅜ in. and larger	4.72c
Open-hearth spring steel	8.00c
Standard cast steel, base price	16.00c
Extra cast steel	18.00 to 20.00c
Special cast steel	23.00 to 25.00c

Tank Plates—Steel

¼ in. and heavier 4.27c

Sheets

Blue Annealed

	Per lb.
No. 8 and 3/16 in.	5.12c
No. 10	5.17c
No. 12	5.22c
No. 14	5.27c
No. 16	5.37c

Box Annealed—Black

	One pass, soft steel, per lb.	C. R. Wood's refined, per lb.
Nos. 18 to 20	6.02c	——
Nos. 22 and 24	6.07c	7.62c
No. 26	6.12c	7.67c
No. 27	6.17c	——
No. 28	6.22c	7.82c
No. 29	6.32c	——
No. 30	6.42c	——

No. 28, 36 in. wide, 10c higher.

Genuine Russia, as per assortment ..... 22½ @ 25c

Patent planished, W. Dewees Wood.

A 13 to 13¼c; B 11 to 11¾c net

Galvanized

	Per lb.
No. 14	6.67c
No. 16	6.82c
Nos. 18 and 20	6.97c
Nos. 22 and 24	7.12c
No. 26	7.27c
No. 27	7.42c
No. 28	7.57c
No. 30	8.07c

No. 28, 36 in. wide, 20c. higher.

Corrugated Roofing, Galvanized

2½ in. corrugations, 10c. per 100 lb. over flat sheets.

Brass Tubes, Rods and Wire, and Copper Tubes

Manufacturers have withdrawn all quotations because of unsettled prices of raw materials and will only name prices to actual buyers.

Copper Sheets

Sheet copper, hot rolled, 16 oz., 29c. to 31c. per lb.

Cold rolled, 14 oz. and heavier, 1c. per lb. advance over hot rolled.

Polished, 20 in. wide and under, 1c. per sq. ft. extra over 20 in. wide, 2c. per sq. ft. extra.

Planished copper, 1c. per sq. ft. more than polished.

Tinning, one side, 6c. per sq. ft.

Copper Wire

Base price, at mill ..... 3[illegible]

Tin Plates

Bright Tin	Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20
IC	$11.65	$10.40
IX	13.85	12.35
IXX	15.60	14.10
IXXX	17.35	15.85
IXXXX	19.10	17.60

Coke—14x20

	Primes	Wasters
80 lb.	$8.70	$8.[illegible]
90 lb.	8.80	8.[illegible]
100 lb.	8.90	8.[illegible]
IC	9.15	8.[illegible]
IX	10.30	10.[illegible]
IXX	11.45	11.[illegible]
IXXX	12.60	12.[illegible]
IXXXX	13.75	13.[illegible]

Terne Plates

8-Lb. Coating 14x20

100 lb.	$8.80
IC	9.00
IX	10.00

Tin

Straits pig	7[illegible]
Bar	85c to 9[illegible]

Copper

Lake Ingot	24c to 2[illegible]
Electrolytic	24c to 2[illegible]
Casting	24c to 2[illegible]

Spelter and Sheet Zinc

Western spelter	10c to 1[illegible]
Sheet zinc, No. 9 base, casks	15c; open 15[illegible]

Lead and Solder*

American pig lead	7c to 7[illegible]
Bar lead	8c to [illegible]
Solder ½ & ½ guaranteed	[illegible]
No. 1 solder	[illegible]
Refined solder	[illegible]

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	[illegible]
Commercial grade, per lb	[illegible]

Antimony

Asiatic	10c to 1[illegible]

Bismuth

Per lb.	$4.50 to $[illegible]

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting (carload lots), f.o.b. mill, per lb	2[illegible]
In small lots	40 to [illegible]

Old Metals

The market continues dull. Dealers' buying prices are nominally as follows:

	Per lb.
Copper, heavy and crucible	[illegible]
Copper, heavy and wire	[illegible]
Copper, light and bottoms	[illegible]
Brass, heavy	[illegible]
Brass, light	[illegible]
Heavy machine composition	[illegible]
No. 1 yellow rod brass turnings	[illegible]
No. 1 red brass or composition turnings	[illegible]
Lead, heavy	[illegible]
Lead, tea	[illegible]
Zinc	[illegible]